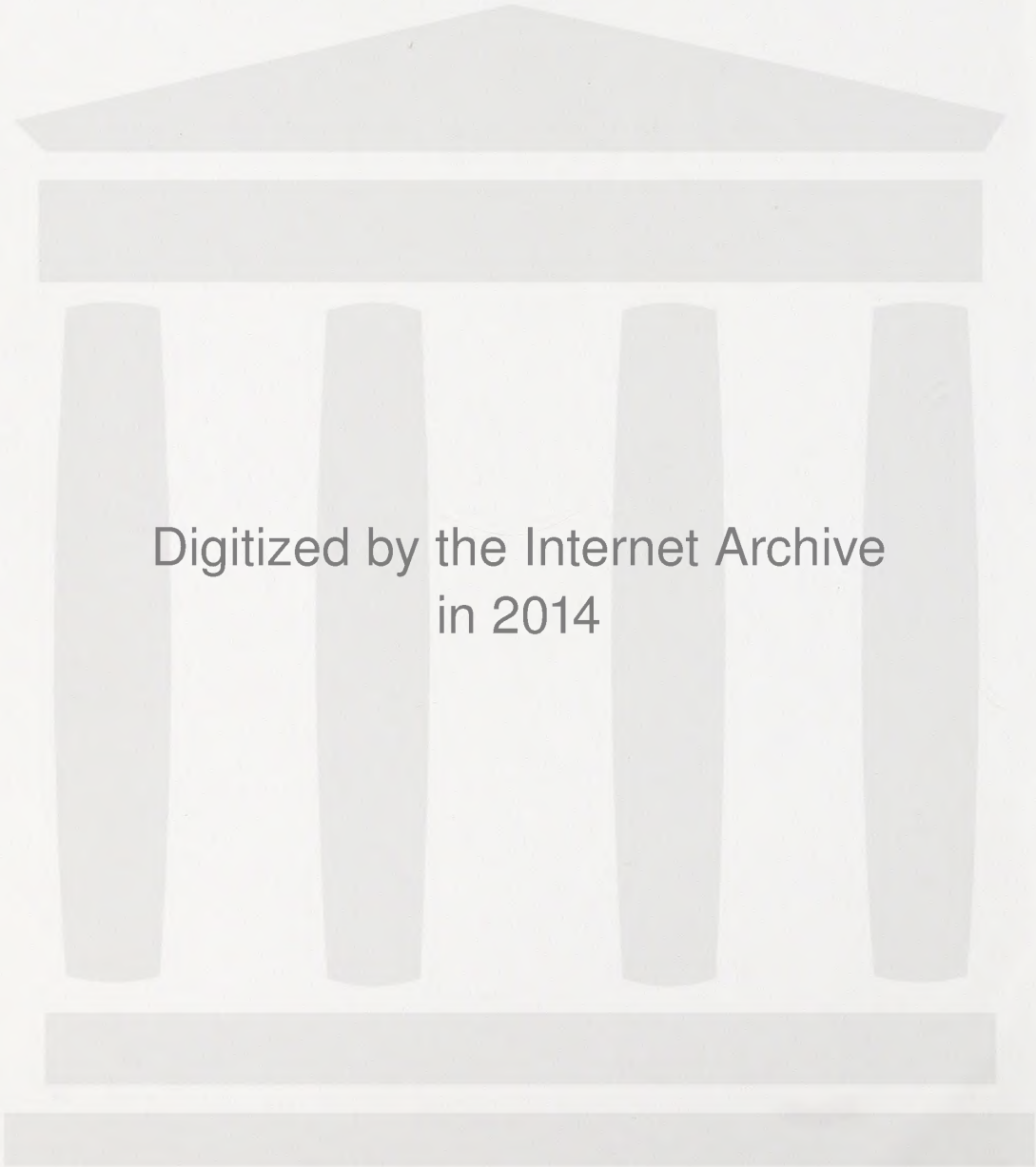

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FOR THE BIENNIUM
JULY 1, 1968 - JUNE 30, 1970

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Wildlife IN NORTH CAROLINA

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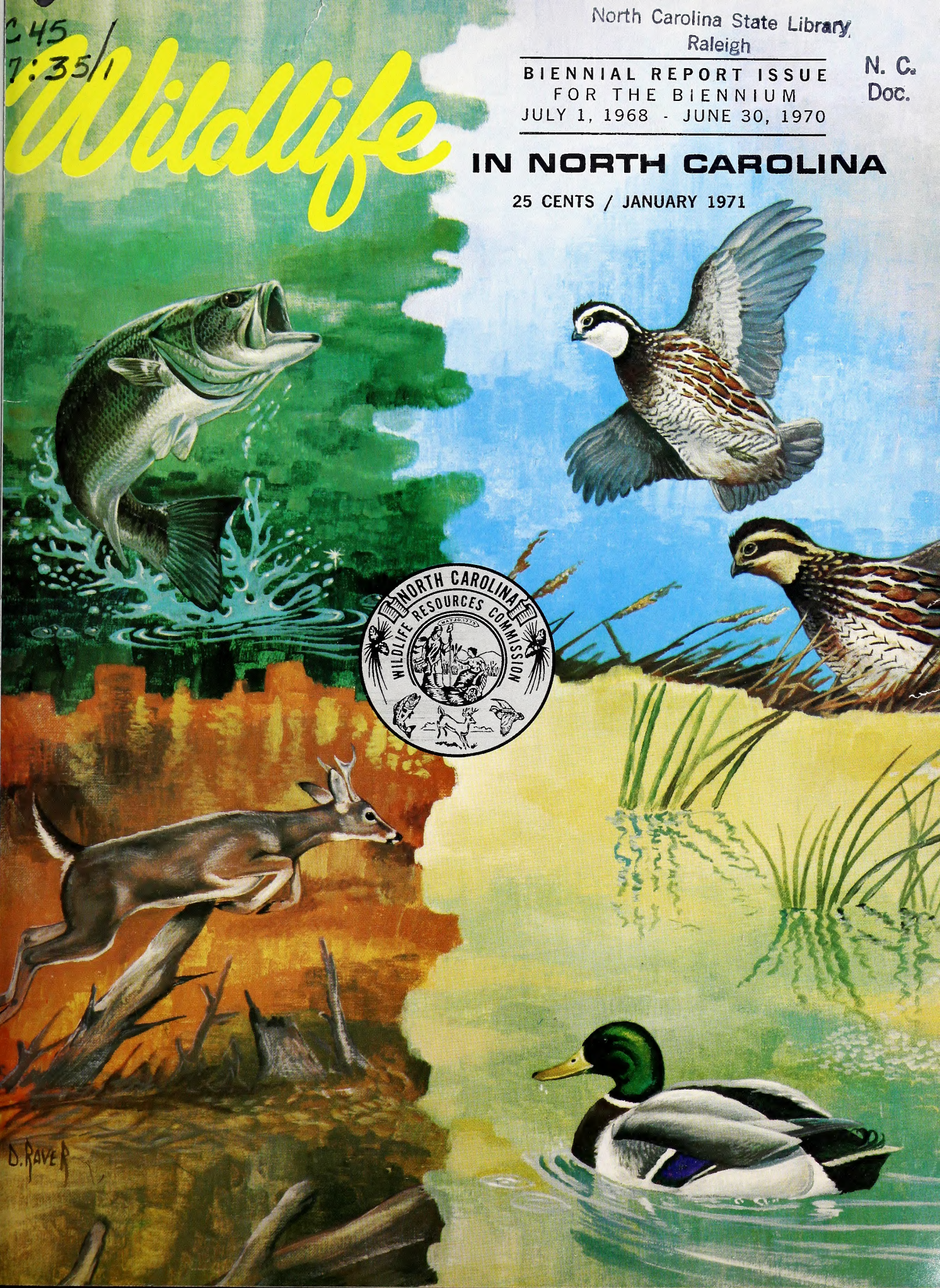

State of North Carolina

Wildlife Resources Commission

RALEIGH, N. C. 27602

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His Excellency, The Governor of North Carolina
The Honorable Members of the General Assembly
Raleigh, North Carolina

Dear Sirs:

We are very much pleased to submit to you our 12th biennial report for the period July 1, 1968 to June 30, 1970.

The Wildlife Resources Commission and its staff have given undivided, dedicated attention to the wildlife conservation and boating safety work during this two-year period. As a result, much progress has been made and is described in the body of the report.

It has been an honor and a privilege for us to serve the State and its people in our various positions with the Wildlife Resources Commission.

Sincerely,

Jay Waggoner

Jay Waggoner, Chairman
Wildlife Resources Commission

STATE OF NORTH CAROLINA

ROBERT W. SCOTT
GOVERNOR

NORTH CAROLINA
WILDLIFE RESOURCES COMMISSION

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

* * *

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VOL. XXXV, NO. 1 JANUARY, 1971

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The Commission

The Wildlife Resources Commission, a nine-member policy-making body appointed by the Governor, met eighteen times this biennium. Its long-range programs of Regulation, Enforcement, Education, Management, and Research were re-examined and modified to meet the needs of the public today.

One of the most important responsibilities of the Commission was the annual updating of regulations governing hunting, trapping, fishing, and boating. In April of each year of the biennium, the Commission met to set tentative hunting and trapping regulations. Then in May these tentative regulations were presented to the public through the medium of public hearings in each of the nine wildlife districts of the state. Finally, in June of each year the Commission met again to establish the hunting and trapping regulations for the coming year. Following this meeting, the regulations were published in the newspapers, filed with the Secretary of State, and the Clerks of the Superior Courts of North Carolina. In addition, over 400,000 copies of these regulations were distributed to license buyers throughout the state. Essentially the same processes were followed in setting fishing and boating regulations. An additional function relating to regulations was the periodic amendment of annual regulations as emergency conditions dictated.

The Commission took appropriate action on many other important matters affecting the operation of the agency and the sports of hunting, fishing, and boating. Among these the following were most important:

- Prepared and adopted a budget for the next biennium and periodically updated the current budget to meet emergency conditions.
- Approved capital improvement projects, such as game land and boating access acquisition, construction of a much needed warehouse and equipment depot on the outskirts of Raleigh, and construction of a hatchery superintendent's residence at Waynesville Fish Hatchery.
- Established two additional rest areas for waterfowl on Currituck Sound, and two multi-use impoundments on the Caswell Wildlife Management Area.
- Directed enlargement of the program to establish, on leased land near urban centers of population, dove and small-game hunting areas.
- Developed a license agreement with the U. S. Corps of Engineers to obtain Eagle Island near Wilmington for a waterfowl public hunting area.
- Leased land in Johnston County and established the Hackney Game Restoration Area.
- Approved sale of Pineola Hatchery, which because of a diminishing water supply could no longer operate effectively. Approved use of sale money for construction of new hatchery at Basin Creek, south of Doughton Park.
- Established policy regarding use of Commission game lands for other recreation purposes, provided such use would have no significant adverse effect on the continued use of these lands for hunting and fishing; and provided further, that recreational facilities created would be open to the public and not used for commercial purposes.
- Reiterated its long-time policy of protecting and enhancing the public resource represented by fish and game by instructing the Director and staff to take appropriate action relative to flood control, stream channelization, drainage of hardwood swamplands, and urban degradation of water quality in the public waters of the state, to insure adequate protection of fish and game.
- Endorsed the Police Information and Communications Network for North Carolina as proposed by the Governor's Committee on Law and Order.
- Entered into a cooperative agreement with North Carolina State University for establishing a Cooperative Fishery Unit Program.
- Restructured the administrative functions of the Commission by establishing a second Assistant Director and reassigning administrative functions to one assistant and field operations to the new position.
- Established a new division—the Motorboats and Water Safety Division—and assigned all applicable motorboat functions of the Commission to the division.
- Reaffirmed its long-held position that the states rather than the Federal Government have jurisdiction over fish and resident wildlife.

The nine-member Commission was responsible for the formulation of policy and the review of plans designed to maintain good hunting and fishing in the Tar Heel State.

Administrative Services

Administrative services for the Commission included such internal operations as licensing, registering motorboats, collecting revenue, processing magazine subscriptions, budgeting, disbursing of funds, accounting, auditing, data processing, and warehousing. The degree of coordination and the efficiency of these services directly affected the policies, programs, and field operations of the Commission.

A brief description of the various administrative services performed follows:

REVENUE COLLECTION

Licensing

The Commission is almost entirely self-supporting, in that it obtains no money from the General Fund for the operation of its wildlife programs and projects. The principal source of the Commission's operating funds comes from the sale of hunting, fishing, and trapping licenses. Sale of licenses is accomplished almost entirely through carefully selected license agents. Applications for license agencies are received from local businesses throughout the state. Appointments are made on the basis of location and need for an outlet in a given locality. Service to sportsmen is a major determinant of eligibility. Agents are consigned licenses and must file monthly reports with the Commission. During the biennium the Commission sold licenses through the services of more than eleven hundred agents.

In 1969 the General Assembly increased the fees for many license categories to provide additional funds to meet rising costs and to provide funds for new and additional services requested by sportsmen. The increase in hunting license fees became effective August 1, 1969; however, the increase in fishing license fees did not become effective until January 1, 1970, too late to have much effect on revenue for the biennium.

Revenue from the sale of licenses and permits increased from $6,022,769 for the biennium ending June 30, 1968 to $7,057,898 for the biennium ending June 30, 1970.

Motorboat Registration

The Commission is responsible for the administration of North Carolina's boat numbering and boating safety laws. During the biennium, registration certificates and boat numbers were issued to owners of boats powered with motors of over 10 horsepower.

For the calendar year ending December 31, 1968, the Commission registered 64,788 boats, and for the calendar year ending December 31, 1969, the number of registered boats had increased to 70,685. In addition, numerous duplicates of registration certificates and transfer of ownership certificates were processed during the biennium. Revenue to finance registration and numbering came primarily from fees charged boat owners for this service.

The handling of almost two million licenses and permits during the biennium required the constant attention of personnel trained in various skills of accounting, bookkeeping, and record maintenance. The number of each kind of license or permit and dollar values are found on pages 34 and 35.

Federal Aid to Fish and Wildlife Restoration

During the biennium, the Commission kept detailed accounting records on Federal Aid project expenditures and submitted vouchers for reimbursement from the Federal Government for 75 percent of the State funds expended to finance approved projects. In fiscal year 1969 ending June 30, 1969, Federal reimbursement for State expenditures on fisheries projects amounted to $135,326.94. In fiscal year 1970, the reimbursement for fisheries projects was $180,518.98. In fiscal year 1969, reimbursement for State expenditures on wildlife projects was $474,382.46. In fiscal year 1970, reimbursement for wildlife projects was $659,147.67.

Miscellaneous

Other revenue during the biennium, primarily resulting from normal operations of the Commission's programs, consisted of receipts from the sale of timber from Commission-owned lands managed for wildlife and timber production and the sale of educational publications such as WILDLIFE IN NORTH CAROLINA, the Commission's official monthly magazine.

GENERAL ACCOUNTING

The Commission draws upon three special funds for the conduct of its operations. The Wildlife Fund finances all operations and capital improvement projects relating to wildlife; the Motorboat Fund, all operations and capital improvement projects relating to motorboats and boating safety; and the Capital Improvement Fund, which draws upon the other two, is used for financing land acquisition and construction projects.

During the biennium, the various programs of the Commission were implemented by means of allotment requests to the Department of Administration's Budget Division, processing and auditing invoices, preparing vouchers, and compiling reports for the use of the executive director and administrative staff for management and planning purposes.

• **continued on page 30**

Division of Protection

The outstanding success and public acceptance of North Carolina's wildlife conservation and boating safety programs has been largely attributable to the Wildlife Resources Commission's uniformed representatives, its field law enforcement personnel. By devotion to duty, these men have advanced the public's interest in wildlife resources and the public's safety on our public waters. By demonstrating how a vigorous, firm, fair, and impartial enforcement program should be conducted, they have continued to improve their relationship with the hunting, fishing and boating public, and have enhanced public regard for the sincerity and dedication with which the Wildlife Commission pursues all its programs.

The principal effort of the Division of Wildlife Protection continues to be aimed at the intentional violators of state law, violators who deliberately perform unlawful acts that deplete our wildlife resources to the detriment of the public interest, or who intentionally conduct themselves so that they infringe upon the right of people to enjoy our public waters safely and peaceably.

Administration

Emphasis was continued on ensuring that the Division was administered at all levels in a manner consistent with recognized personnel management practices. Supervision has remained strong and officers at all levels in the Division have clear-cut lines of authority to follow. As a result, the Division has attained that level of discipline and coordination which is a distinguishing feature of all the best enforcement organizations.

The "patrol area leader" concept, which was developed by the Division several years ago, has continued to prove effective. Several other states have obtained information from the Division on this organizational pattern, and have copied it for their own organizations, thus far with beneficial results in each instance.

Personnel Selection

The day is long gone when haphazard selection of enforcement officers was accepted by the public. Today's increased public consciousness of the difficulty of law enforcement work has made it obvious that only men with an exceptional combination of talent and character can perform these enforcement tasks satisfactorily. Realizing this, the Division has developed a screening and selection procedure for its recruits that evaluates every measurable characteristic of applicants. Comments from supervisory personnel and from the public make it plain that current Divisional recruitment is at the highest level yet attained.

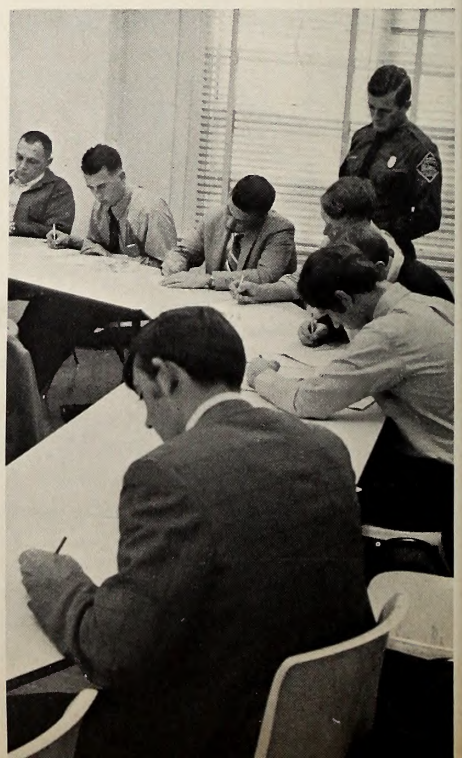
Training

The professionalism of today's enforcement officer requires that careful selection be complemented by training in law and in the skills and techniques unique to the enforcement field. Pre-service and in-service training for the wildlife protectors was accomplished largely through the facilities and staff of the Institute of Government, University of North Carolina at Chapel Hill. In addition to the strictly enforcement-oriented schools, all Division personnel with supervisory authority attended Institute of Government schools on personnel management.

Special training courses were conducted within the Division to ensure that all personnel held advanced first-aid certificates and that all were qualified as radiological monitors in conformity with the Wildlife Commission's Civil Defense responsibilities.

The extent and effectiveness of the Division's

Periodic staff meetings enabled field supervisory personnel to maintain close contact with Division administrative policies. Here, wildlife protection supervisors discuss future plans wth division chief and assistant chief. At right, competitive exams were given to prospective trainees after careful screening.



training programs is emphasized by the fact that information on North Carolina's systems and techniques for selection and training of wildlife conservation enforcement personnel was requested from many other states, including Alaska, and from two provinces of Canada. One New England state sent three of its conservation officers to North Carolina for several weeks to observe these functions of the Division. The Division has received national recognition as one of the premier leaders in these fields.

Equipment

Additional and more modern equipment, suitable to accomplishing the Division's assigned tasks, was acquired during the biennium. All officers of the Division were assigned motor vehicles specially designed and equipped to meet the heavy-duty needs of enforcement work. This led to a higher apprehension rate of major violators of the game laws. Additional 4-wheel-drive vehicles were obtained, so that each of the nine administrative districts now has at least one such vehicle for access to remote areas in rugged terrain.

One additional aircraft was acquired — a twin-engine plane uniquely suited for use on aerial night patrols that have become an important part of the Division's activities in controlling night deer hunting.

As it became necessary to replace boats and motors, fast modern vessels suitable for use in the policing of marine activities were acquired.

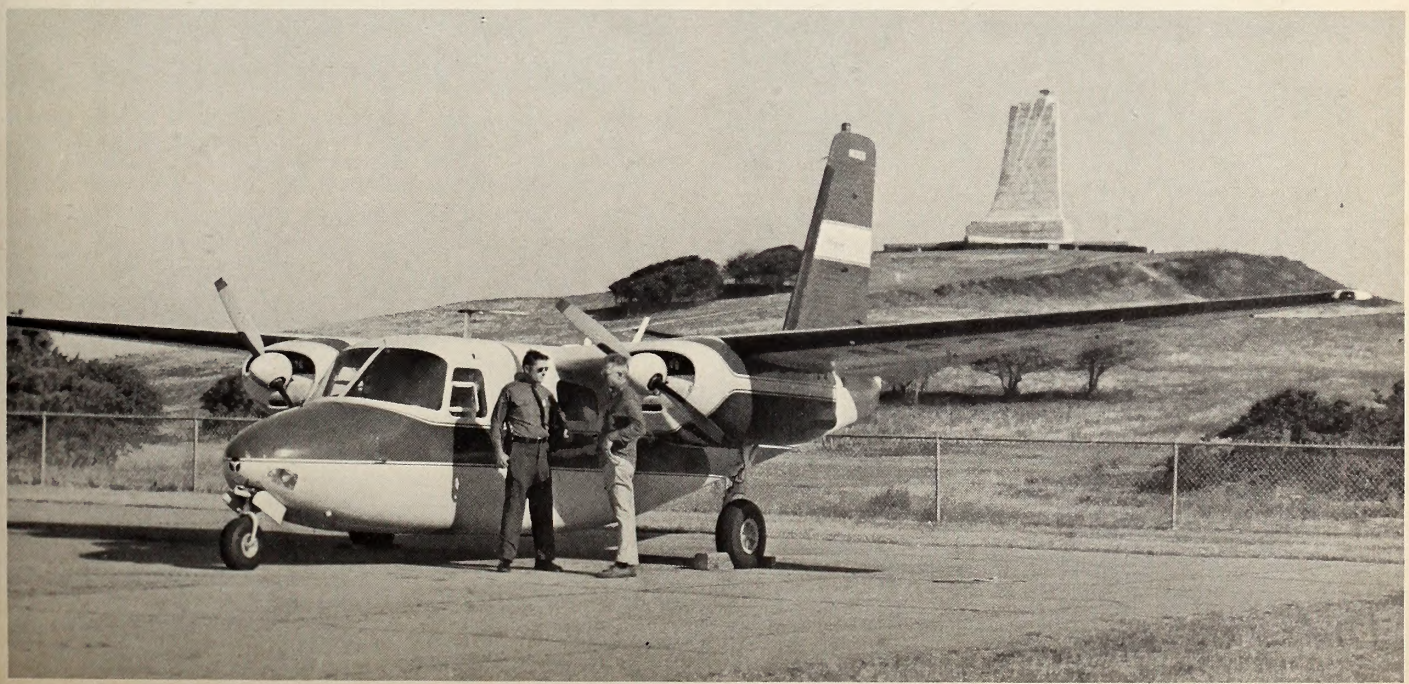
A large proportion of the wildlife protector's time was devoted to enforcement of wildlife regulations in the field. Routine checks of hunting and fishing licenses, boat registration and safety equipment, plus many related activities consumed well over 90 percent of the protector's work time.

Field Operations

The following tabulation will show the extent and magnitude of the Division's enforcement activities during the biennium.

	Year 1968-69	Year 1969-70
Hours patrol, hunting and fishing	392,092	304,620
Hunters and fishermen checked	366,838	375,465
Number of violations	9,957	10,272
Violation rate	2.71% (1/37)	2.74% (1/37)
Number of convictions	9,662	9,899
Conviction rate	97.0%	96.4%
Hours patrol, boating	14,547	17,760
Number of boats checked	78,414	75,951
Number of violations	2,663	2,290
Violation rate	3.40% (1/29)	3.02% (1/33)
Number of convictions	2,581	2,183
Conviction rate	96.9%	95.3%

The necessity for assigning personnel to non-enforcement duties reduced by approximately 6% the hours of patrol during the second year of the biennium. Such things as the large number of fish kills in that year required the services of large details of men and reduced the proportion of the



This Aero Commander 500 was acquired for more efficient coverage of the wide range of enforcement problems increasing annually. It was particularly adapted to night patrols and has been effective in night deer hunting cases when used in conjunction with several ground vehicles.

Division's time that could be devoted to enforcement to about 85%.

An encouraging item in field operations statistics was the steady decline in the violation rate of motorboat operators. From a violation rate of approximately one in ten for 1960 to one in 33 for 1969-70, it is apparent that the steady enforcement and educational effort made on motorboating showed significant results.

Although fewer hours were devoted to patrol in the second year of the biennium, the number of hunters and fishermen checked increased. This came about through an increasingly effective utilization of manpower.

Although the Division's personnel recognize that an enforcement officer's—or an enforcement organization's—best public relations is demonstration of effective, fair and impartial law enforcement with the public good as its ultimate aim, more formal aspects of public relations work were not ignored by the enforcement personnel. Boating-safety demonstrations, voluntary pre-launch boat inspections, boating-safety lectures, hunter-safety demonstrations, and hunter-safety classes were held for many thousands of interested citizens. In addition, the showing of films from the Commission's library and talks to school and club groups presented the Commission's program to additional thousands.

Summary

The accomplishments of the officers of the Division of Protection continued to provide a foundation for accomplishment of all the Commission's programs, as has been the pattern in previous years. The Division's continuing efforts to increase its effectiveness and efficiency, and to provide constant high-visibility examples of the Commission's dedication and sincerity in the pursuit of its programs, should provide a continuing foundation for success.

Important non-enforcement activities included the teaching of hunter safety courses, particularly to youth groups. All wildlife protectors are trained National Rifle Association hunter safety instructors.

Wildlife protectors were frequently called on to talk to school groups or to lead field trips for the purpose of studying wildlife conservation. Below, modern equipment in trained hands resulted in efficient operations.

Division of Inland Fisheries

The Division of Inland Fisheries is charged with the responsibility for manipulation of the freshwater fisheries' resources towards the goal of maximum harvest for the licensed angler without jeopardy to the resources. In working towards this objective the Division conducted a balanced action program involving active management of the fishes and their habitat, supported by research to obtain facts necessary for the framework of management, and supplemented by recommendations for appropriate protective regulations as well as the educational measures to inform the fishermen. There follows a recapitulation of the major activities conducted during the current biennium.

MANAGEMENT

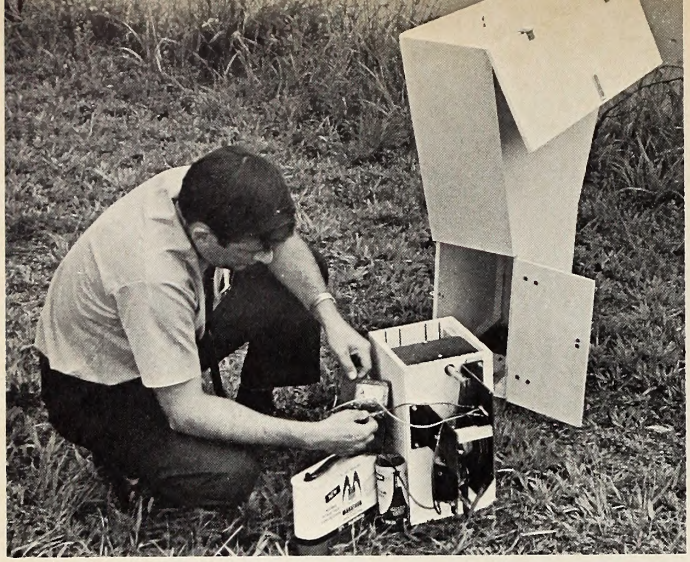
— Trout —

Intensive management of the trout resources, so important to western North Carolina, has been a prime activity of the Division. Approximately one-fifth of the entire population of the United States lives within 500 miles of North Carolina trout waters, and the problem posed is just how to make some 2,000 miles of trout water, open to public fishing, meet the recreational demand — along with supplying some fish to all comers. About 1500 miles of the waters are kept open to public fishing through agreement with the landowners, and these waters are regularly stocked throughout the open trout season with yearling fish to protect the natural trout population against over-exploitation. Another 300 miles of waters on lands owned by the Federal Government, or under long-term lease by the State, plus 200 miles within the Wildlife Management Areas, are similarly managed.

Also, within the carefully controlled Wildlife Management Areas are some 140 miles of water subject to special Native Trout, and 14 miles of water subject to Trophy Trout, fishing regulations. The latter regulations are predicated upon a "high-catch but low-kill" philosophy which at this time appears the ultimate answer that trout management can provide to satisfy the ever-mounting pressures for trout fishing being applied to the very limited waters capable of supporting it. These regulations form a compromise between the prohibitively expensive "put and take" stocking, and the purely "fishing for fun" concept that holds the interest of only the more dedicated fishermen. All streams under Native Trout and Trophy Trout management were annually subjected to biological evaluation to determine if the existing year-class recruitment was adequate to support acceptable levels of recreational fishing along with sufficient harvest to maintain angler interest. Where a deficiency in either appeared likely, and the natural food supply could support additional fish, the population void was filled by stocking young-of-the-year trout.

Providing good trout fishing to the growing army of fishermen was one of the primary endeavors during the biennium. In addition to the hundreds of miles open to public fishing under the general regulations, some 140 miles of water were subject to "Native Trout" regulations, in a continued attempt to further the "fish for fun" concept.

Because North Carolina waters are relatively deficient in minerals, and, therefore, of low basic productivity, long-term studies have been underway to determine the economic and biological feasibilities of short-circuiting the long and relatively inefficient natural food chain by the direct feeding of



A self-contained fish feeder was designed for supplemental feeding operations on selected trout streams. The feeder will dispense pelletized trout food automatically and fish growth will be measured.

Various types of artificial fish shelters were employed during the biennium and fishing success around these devices will continue to be measured. One type was a group of old tires securely fastened together.

pelletized trout food. Supplemental stream feeding has required overcoming many obstacles, not the least of which was the need to develop a self-contained mechanical feeder that could be programmed as desired to periodically release a predetermined quantity of food, and yet be rugged enough to withstand field conditions. This has been accomplished and, at the close of the biennium, a carefully controlled study was underway on two Management Area streams which have been especially designated as "Research Waters" whereon all anglers are subject to a complete creel check.

Trout stream improvement has been accomplished, within the limits of available funds, to provide a better balance in the South Toe River between the food-producing riffles and the requisite shelter provided by the deep holes. This stream within the Mt. Mitchell Wildlife Management Area was improved by complementing the nine low-head rock dams constructed during the previous biennium by four larger gabion structures.

— Warm-Water Lakes —

The Division's program that ultimately will reach the greatest number of anglers was applied to lakes and streams open to public fishing that were susceptible to effective management. These waters, and the fish populations therein, were critically studied with the objective of identifying those factors that were limiting the production of fish of a size acceptable to the anglers. Where these factors were correctable within the realm of economic feasibility, action was taken. Lack of adequate shelters has proved a very common deficiency of North Carolina's warm-water lakes, and the judicious location of fish shelters, constructed of discarded tires bound together with nylon line, was highly efficacious.

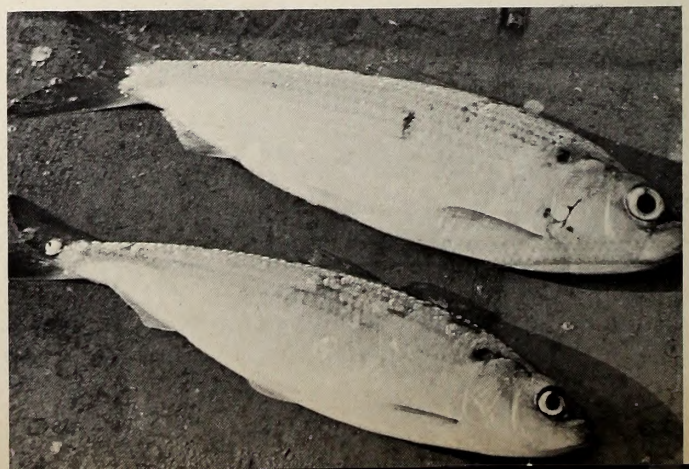
During the biennium, development of the sport fishing potential of community water-supply lakes, as well as that of State-owned lakes, was emphasized. By the end of the biennium the Division held cooperative fish-management contracts with 23 municipalities in the interest of promoting better fishing. These waters were of particular concern because they provided readily available fishing close to areas of dense population.

— Forage Introductions —

Providing a supporting food supply has at least partially eliminated a factor limiting numbers of the highly-prized game fishes in many of the larger reservoirs of North Carolina. Threadfin shad, an exotic species first introduced into High Rock Lake and the Catawba chain of reservoirs in 1961, have provided eminently satisfactory forage, even though the species cannot tolerate most winter-time temperatures in the latitude of North Carolina. Threadfin shad must be reintroduced each year from reservoirs that receive heated water from the condenser discharges of steam plants in which these fish can survive the winter.

The continuing program of annual threadfin shad introduction has proven well worthwhile in all waters other than the cooler reservoirs of the mountains and the acid waters of the Coast. Solution of the forage problem of the mountain reservoirs was attempted through the introduction of smelt, blueback herring, and alewives—which are better adapt-

Blueback herring were introduced in selected reservoirs to determine their usefulness and success as forage fish for the large carnivorous game fish.



ed to the cooler temperatures than are the threadfin shad—and the opossum shrimp, an exotic from the Great Lakes region which seemingly should find these reservoirs congenial habitat. Two acid-water minnows—the Waccamaw silverside and the Coastal shiner—were studied as possible answers to the acid-water forage deficiency. Several years of observations will be required before the real success of these experimental ventures can be appraised.

ENVIRONMENTAL STUDIES

— Biological Water Quality Monitoring —

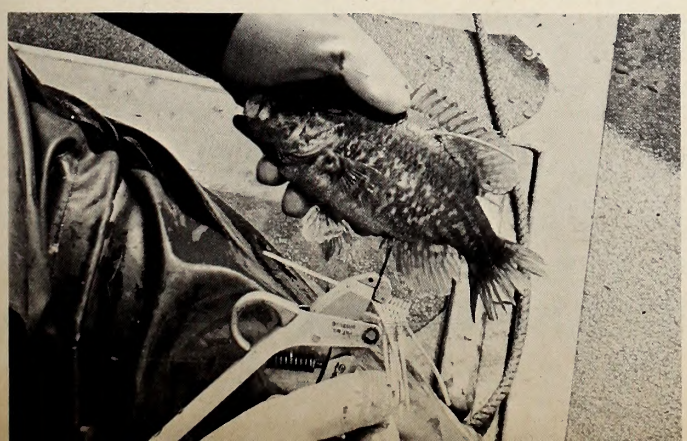
The community of aquatic insects, which constitutes the bulk of food consumed by game fishes such as trout and the sunfishes, has long been recognized as the most sensitive indicator of degraded water quality. Each of these easily-read indices has been severely obscured by the inherent difficulty of collecting a sample representative of the existing insect community. Workers at the Fayetteville Water Quality Laboratory recently developed a small matrix of plastic mesh which, when anchored in a stream, is readily utilized for shelter by most insects present.

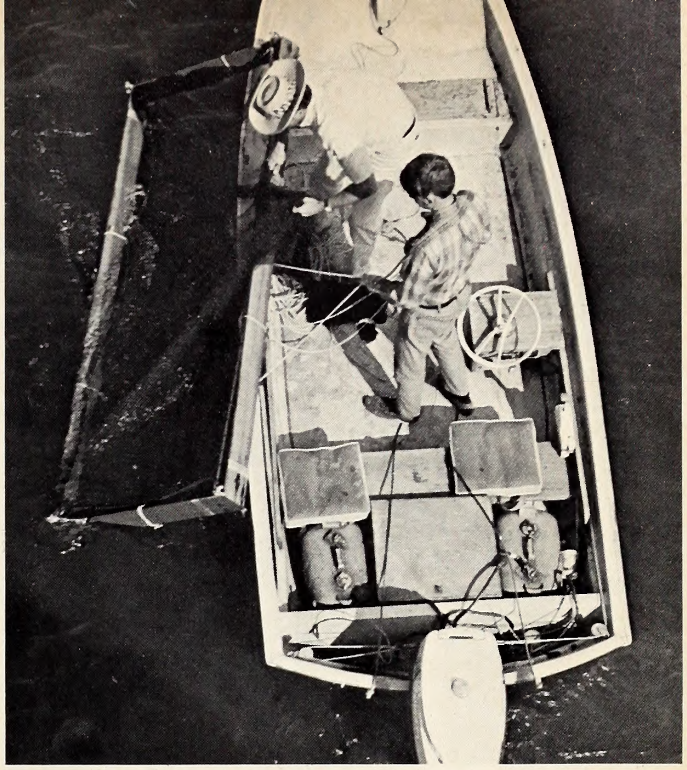
More background work remains to be done before a full evaluation of this method can be made, but it appears very promising at this stage of development that a sampler has been devised which can be submerged in a stream for two to three weeks, retrieved, and the associated organisms recovered to reveal not only the fish-producing quality of that water during the period of submergence—but, perhaps of greater consequence can indicate whether a "slug" of seriously degraded water has passed the sampler during the period of submergence. The latter fact would be completely undetectable in the usual method of chemical water sampling.

— Thermal Enrichment —

The warming of large quantities of water used for cooling condensers at steam plants, while conceivably beneficial up to a threshold point, ultimately may pose a serious threat to the aquatic environment. Fossil fueled and nuclear electric generating plants account for some 80% of all industrial cooling water used in the United States. A study of the effects of the warmed water discharges upon Lake

Several species of fish were trapped from the Chowan River and tagged with a special plastic "spaghetti tag." The fish were then returned to the water; any subsequent re-capture indicated the movement of these fish. This warmouth may have been retaken a mile or more from release site.





Fish populations were studied (here, with a trawl) in Lake Norman to determine the effects of warmed water discharges from electric generating plants on these fish populations and the habitat quality in general.

Norman fishes, undertaken during the 1966-1968 biennium, has continued. Results to date indicate no significant effects upon the reservoir as a whole, but certain localized effects have become quite obvious. Thermal enrichment of the waters in the cove receiving the discharge now permits the overwintering survival of threadfin shad, which has increased the forage-fish potential of the reservoir as well as stimulating an extremely popular sport fishery—particularly for striped bass and white bass. On the other hand, there is some evidence that the higher temperatures have slightly increased the incidence of winter-time fungus infections and infestations by ectoparasites.

— Water Development Projects —

Watershed improvements, planned under the Corps of Engineers' Section 205 Program and the Soil Conservation Service's Public Law 566 projects, in many cases involve varying degrees of game-fish habitat destruction. By maintaining close liaison with these Federal Agencies, particularly during the early stages of project planning, much of the game-fish habitat destruction can be avoided. Usually, more can be accomplished by preventing habitat destruction through coordinated effort with the planning agency than by elaborate and often costly mitigation measures. During the biennium, the plans for some 75 water development projects were critically reviewed with the construction agencies.

— Chowan River Studies —

The study of effects upon Chowan River fishes in North Carolina resulting from the annual discharge of pulp-mill wastes, stored for varying periods of

Close observations of various streams over the state were maintained in order to critically review development projects planned under the Corps of Engineers' Section 205 Program and the Soil Conservation Service Public Law 566. Some 75 water development projects were reviewed. Fyke nets were operated to capture fish used in the Chowan River tagging and recovery study (below).

time in lagoons located just north of the Virginia line, was continued during the biennium. Trap nets were installed at seven locations within the 18-mile reach of Chowan River immediately downstream from the State line. These nets have been operated each year throughout the period of waste discharge, as well as during the three months immediately prior to the waste discharge and over a similar period immediately thereafter. Several thousand fishes taken in these traps have been tagged prior to their release for evidence of enforced migration.

During the past two seasons, little convincing evidence has been obtained indicating the releases of the stored wastes exert any direct adverse effects. All changes noted in the species composition of the net catches, as well as the geographical distribution of tag recoveries can be explained very logically by seasonal migrations normal to the species in question. There is some evidence of indirect effects stemming from the reduced river water clarity during the period of waste discharges, and from the growths of the fungus, *Sphaerotilus,* stimulated by the waste.

— W. Kerr Scott Reservoir Studies —

Another study undertaken during the previous biennium and conducted throughout the current one concerns the apparent low productivity of the cool-water foothills reservoirs. W. Kerr Scott Reservoir, a 1,470-acre impoundment on the Upper Yadkin River, was selected as the type study lake because of its high recreational potential, but relatively poor sport fishing. Early in the study, the poor growth rates, particularly of the desired piscivorous game-fishes, became quite obvious. Brush shelters, and subsequently shelters of old automobile tires, were installed and reputedly have developed better fishing. Attempts at relocating threadfin shad and alewives into W. Kerr Scott during the spring of 1969 failed completely. One year later, both threadfin shad and blueback herring were introduced. Both spawned successfully, and thereby presumably will provide ample forage by mid-summer of 1970.

— Currituck Sound Studies —

The city of Virginia Beach, Virginia, continues to pump salt water from the ocean into adjacent Back Bay for purposes of vegetation and turbidity control. The city has agreed to cease pumping at any time the Back Bay effluent entering Currituck Sound reaches the minimum salinity injurious to freshwater fishes. The Division has continued to monitor Currituck Sound salinities at the Virginia-North Carolina State line, as it has done over the past several years. The Division also maintained surveillance over the spread of Eurasian water milfoil—an exotic water weed that gained entrance to Currituck Sound via the intracoastal waterway and subsequently spread widely and rapidly throughout the Sound. The infestation currently appears to have stopped with approximately 80 percent of the Sound area showing some degree of milfoil growth. A spot check of fishermen's creels

has been maintained at Coinjock and Popular Branch for many years, and as yet neither salinity nor the milfoil seems to have significantly affected catch rates for game fishes.

— Surveys and Methodology —

The trout fishery surveillance undertaken during the previous biennium was completed early in 1970 and revealed, for the first time, many facts of extreme value in future management of the trout program. The 1968 results, confirmed by a repeat in 1969, indicated the total annual trout harvest from the public waters of North Carolina to approximate two million trout—or an average of some 32 trout per season for each licensed fisherman. The overall catch rate for two years was consistent, being 0.78 and 0.79 trout per hour, respectively. Even assuming a rather optimistic catch of the three-fourths million hatchery reared yearling trout released each year in North Carolina waters, it seems certain that the propagation and stocking of hatchery fish contributes but one out of every six trout caught.

The crucial necessity for protecting the wild trout resources against over-exploitation is clearly apparent from these data. The geographic distribution of addresses obtained in the representative sample pulled from trout license record files for these surveys revealed the trout fishery to be distinctly a western North Carolina activity, because 99% of the addresses so obtained were located west of a line drawn between Winston-Salem and Charlotte.

Another study was in progress throughout the biennium to determine which, or what combination, of the many available methods of sampling will yield the most accurate information upon the harvestable fish population in municipal water supply lakes used for recreation. Fish toxicants, customarily used for this purpose in most waters, for obvious reasons cannot be applied in water-supply reservoirs.

Late in the biennium, a versatile electro-fishing unit of recent development was obtained and a study undertaken to determine the specific intensity and nature of the electrical current required to collect fish by temporary shock under the wide spectrum of electrical conductivity encountered in the various waters of North Carolina.

BIOLOGY OF FISHES

— Threadfin Shad —

Because of its great potential in supplying forage needed by the larger piscivorous game fishes, the threadfin shad was subjected to a study of its basic biology, ecological requirements, and physiological limitations in North Carolina waters. Some of the facts uncovered during the investigation explained why this exotic has done so well under certain circumstances, yet failed completely in others.

— Roanoke Bass —

Study continues with this species that remained unkown in North Carolina until it was accidently discovered about ten years ago. It is a highly prized trophy-type sunfish which attains a weight of 2 to 4 pounds. The natural distribution of this species is restricted to a few clear, unpolluted streams of the Upper Tar and Neuse Basins. Many details of the life history, as well as the ecological requirements of this unique fish, have been determined during the biennium. Apparently this species lacks the reproductive potential to support very heavy fishing pressure. It might do well, however, in a few restricted areas of suitable habitat as a choice trophy fish. The Roanoke bass was experimentally relocated into apparently suitable streams of the Yadkin River drainage, but it will be several years before the success of this venture can be ascertained.

— Redbreast Sunfish —

The redbreast sunfish, more popularly known as the "robin", is perhaps the most widely distributed game fish of North Carolina, being found in 23 of the 26 major watersheds of the State. It assumes particular significance as a game fish in the Coastal Plain streams. In spite of its statewide popularity as a game fish, comparatively little is known of the basic biology of the species upon which its effective management must be based. Accordingly, a study of the basic biology, physiological characteristics, and ecological requirements of this species was undertaken during the biennium to provide a framework of reference upon which effective management of the redbreast sunfish resources of the State can be based. To date, the investigation has been restricted to the migration patterns and spawning behavior of the redbreast sunfish in the Black River watershed. Redbreast sunfish were first

The biology of the redbreast sunfish was studied to provide a framework of reference on which to base more effective management. Movement of individual fish was traced by tagging and recovery. (insert)

Various locations were sampled for redbreast sunfish to discover relative populations and provide fish for tagging. Where stream conditions permitted, seining was used. Small traps were also effective.

observed spawning in early June when water temperatures approximated 75°F. The redds (fish beds) averaged 36 inches in diameter and 8 inches in depth. All redds were found at water depths of 14 to 15 inches in a sand and small-gravel substrate and invariably were located within the shelter of submerged logs or snags.

— Striped Bass —

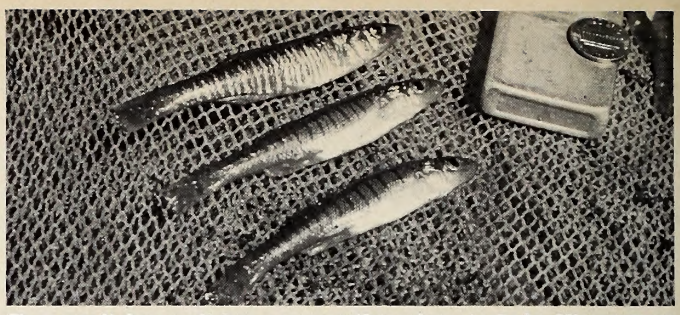
During the biennium, advantage was taken of several opportunities to determine the factors affecting the success or failure of striped bass introductions into Piedmont Reservoirs. A study also was launched into the little-known striped bass spawning runs into the Tar and Neuse Rivers which support a moderately intense sports fishery. To date, most work in the latter study has been exploratory in nature as attempts to obtain a sufficient number of specimens to support a tagging program, by which the migrations of the river populations could be traced, have been unsuccessful.

— American Shad —

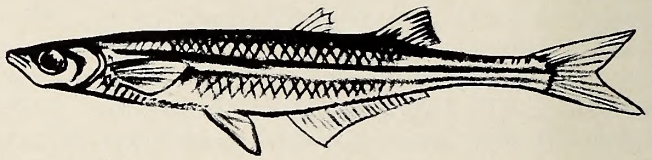
The Division continued its cooperative work with the Corps of Engineers each spring of the biennium in passing American shad through the navigation locks of the Cape Fear River. This project, undertaken a decade ago as a cooperative venture with the Corps of Engineers and the Commercial Fisheries, restored accessibility to the ancestral spawning grounds of the American shad in the Cape Fear River. The American shad population of the river has responded, in that their numbers have increased approximately to those of the early 1900's.

CONSULTATION AND EDUCATION

Much time during the biennium was devoted to consultation services ranging in scope from the



Two small forage fishes, apparently unique to Lake Waccamaw, were observed during the biennium. The Waccamaw killifish, Fundulus waccamensis is shown above; the Waccamaw silverside, Menidia extensa below. The silverside was studied extensively as a potential forage species for other waters similar to Waccamaw. It was very delicate to handle.



During the biennium, assistance was given other divisions, including aid to the Division of Education in filming various field activities for television and subsequent feature films. Fish hatchery operations required hundreds of man-hours (below) to maintain peak efficiency.

biological aspects of the Annual Fishing Regulations, to advice to individual fish pond owners. Reports upon all studies in progress were prepared each year to meet Federal Aid requirements and to dispense the information to interested individuals. Many popular and technical publications were written in addition to programs presented to interested civic and sportsmen's organizations. The Division also cooperated with the Division of Education in planning and operating the Commission's exhibit at the North Carolina State Fair and with several television productions concerning sport fishing.

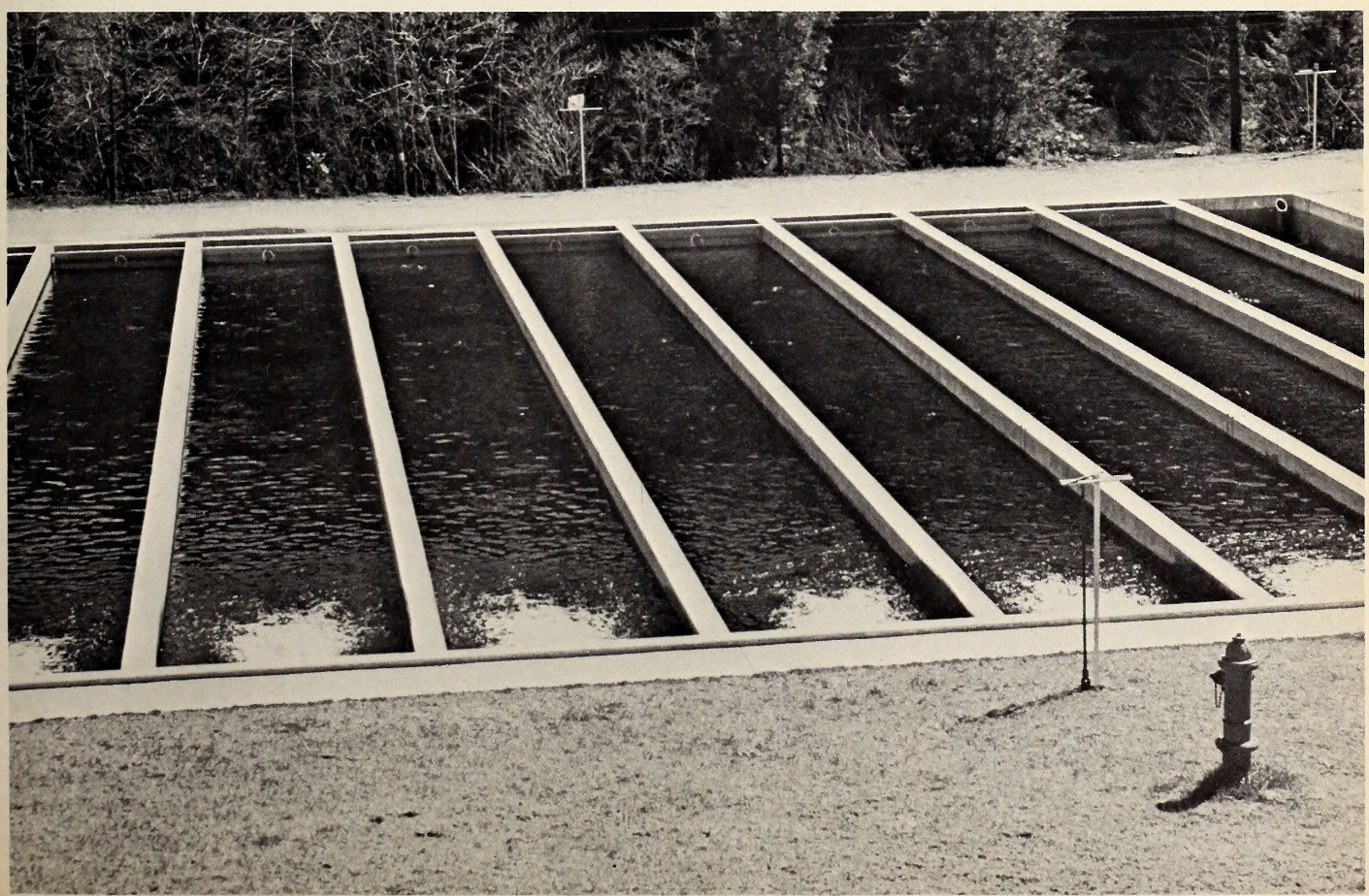
HATCHERY PRODUCTION

Plans for the dam and pipeline for the Basin Creek Hatchery were completed.

The highway construction, which has handicapped operation of the Waynesville Hatchery during the past two years, was completed and the hatchery resumed full operation. A new duplex residence was constructed to house the Superintendent and an Assistant. The old residence was removed to make room for the highway.

Muskellunge fry were obtained in the spring of 1970 from the Tennessee and Pennsylvania Wildlife Departments and are being raised at the Marion and Table Rock Hatcheries. The plans are to raise them to maturity, and their progeny used for restocking waters in which this species occurred prior to the serious pollution which recently has been corrected.

Some 285,000 pounds of trout were stocked in public waters from Federal hatcheries. Almost 4 million warm water fish were stocked. New hatchery facilities constructed during the biennium included this series of raceways (below) at the Armstrong Creek hatchery near Marion.



FISH STOCKING

Biennium, July 1, 1968 to June 30, 1970

TROUT

STATE PRODUCTION

Species	Yearlings	Pounds	Fingerlings	Pounds	Yearlings	Pounds	Fingerlings	Pounds
	1968-1969				1969-1970			
Brook trout	202,416	51,384	708,143	5,475	102,262	33,452	418,191	5,245
Brown trout	144,823	30,606	411,287	1,375	109,363	24,359	42,370	797
Rainbow trout	187,417	60,645	237,767	4,945	182,429	62,691	187,895	4,726
TOTALS:	534,656	142,635	1,357,197	11,795	394,054	120,502	648,546	10,768

FEDERAL PRODUCTION

Species	Yearlings	Pounds	Fingerlings	Pounds	Yearlings	Pounds	Fingerlings	Pounds
	1968-1969				1969-1970			
Brook trout	60,878	22,177	8,000	4	70,840	18,818	_____	_____
Brown trout	37,383	10,689	50,000	1,558	69,030	15,113	6,000	600
Rainbow trout	140,313	43,681	92,000	766	174,600	45,886	295,000	3,024
TOTALS:	238,574	76,547	150,000	2,328	314,470	79,817	301,000	3,624

WARM WATER FISHES

Species	1968-1969	1969-1970
Largemouth bass	652,087	207,956
Smallmouth bass	116,896	77,845
Bluegill	292,096	573,850
Shellcracker	394,136	728,600
Redbreast sunfish	428,880	319,784
Roanoke bass	12,411	_____
TOTALS:	1,896,506	1,909,035

RELOCATIONS

Species	1968-1969	1969-1970
Threadfin shad	31,992	19,296
Herring	1,527	1,470
White bass	197,415	212
Opossum shrimp	_____	20,000
Roanoke bass	_____	42
TOTALS:	230,734	41,020

ANADROMOUS FISH

Species	1968-1969	1969-1970
Striped bass		
Fingerlings	304,408	92,979
Fry	18,787,000	10,286,300
Eggs	55,187,000	0
TOTALS:	74,278,408	

Division of Game

The Division of Game is charged with the responsibility of providing leadership and technical guidance in conducting the Commission's statewide game management program on both Commission-controlled and privately-owned properties. For planning and supervision of this important work, 22 professionally-trained biologists were stationed at strategic locations throughout the state. To carry out scientifically designed management programs for the production and harvest of game, 32 area managers and assistants direct operations on 31 wildlife management areas which comprise more than 600,000 acres in aggregate. The remainder of the Division of Game's 69 member staff consists of equipment operators, nurseymen, utility men and two stenographers. In addition, 326 part-time aides and laborers were employed for special assignments and to assist in activities in all parts of the state.

During the past biennium it became increasingly apparent that the survival of many wildlife species and the future of certain types of outdoor recreation, including hunting, are dependent upon the design of land-use programs that involve manipulation of large land and water areas. Technicians of the Division of Game redoubled their efforts to point up wildlife values and to stress the importance of including wildlife considerations in the development of long-range programs that may drastically affect the well-being of man as well as other forms of life.

Working in close cooperation with state and federal agencies, conservation organizations and other groups and individuals who are concerned with the situation, Division personnel were instrumental in shaping some resources management programs to include retention of essential wildlife habitat components and mitigation for unavoidable losses. While important progress in this area was being made during the past biennium, plans were also formulated for greater future effort to prevent further destruction of irreplaceable natural wildlife habitat.

Wildlife Development on Privately-Owned Lands

The continuing trend toward consolidation of small farms into large land management units for crop production and other purposes demands more intensive and extensive use of land areas that heretofore provided natural wildlife habitat in which game species thrived and multiplied. Because 80 percent of the annual crop of game is produced and hunted on privately-owned property, the Commission's upland game restoration project continued to be one of its most important functions. District game biologists responded to 728 requests from landowners and sportsmen for technical assistance in planning wildlife habitat improvements on farms and other game-producing areas. To carry out plans for increasing the game carrying capacity of intensively cultivated and grazed agricultural lands, special game food and cover planting materials were produced at the Commission's Sandhills nursery and distributed free of charge, on a first come-first served basis, to cooperating Tarheel sportsmen and landowners. These materials were selected for compatibility with modern agricultural practices and for their ability to produce bountiful crops of seed on fractional acreages of little importance in cropping programs.

The following amounts of planting materials were distributed to 8,777 cooperators during the biennium: 2,795,000 shrub lespedeza seedlings;

Free distribution of wildlife habitat improvement planting materials was of major importance during the biennium. Shrub lespedeza seedlings formed this border (below), and annual seed mixture created the food patch shown at right.

174,410 multiflora rose seedlings; 7,949 three-pound units of a perennial seed mixture; 2,557 two-pound units of sericea lespedeza seed; and 41,447 five-pound units of annual seed mixture. The district game biologists supervised and participated in delivery of materials, assisted by temporary farm-game workers who were trained to advise farmers in the selection of suitable planting sites and cultural methods. During the second year of the biennium, wildlife protectors provided yeoman service in delivering planting materials.

Semi-annual surveys were conducted to determine utilization of materials and the quality of resulting plantings. The most recent survey indicated that more than 80 percent of the seed and seedlings distributed were planted and produced substantial quantities of food and cover for game in every county of the state.

Small game public hunting areas were leased and developed near population centers of the state to provide hunting opportunity for sportsmen in urbanized areas where access to the better hunting territory is difficult to obtain. Seven areas, averaging 2,000 acres in size, were in operation during the 1968-69 hunting season; five areas were leased and developed for the 1969-70 season. A season permit was required in addition to the standard hunting license. Hunting for all game species, in conformance with statewide open seasons, was allowed on Mondays, Wednesdays and Saturdays and on Thanksgiving and Christmas days. The district biologists negotiated leases and supervised the posting of boundary lines and planting game habitat improvements. The Commission provided specialized seed mixtures and paid the landowners for planting and cultivating game food patches which included special dove attractant plantings on several areas.

Fifteen public dove hunting areas were leased and developed for Wednesday and Saturday afternoon hunting each year of the biennium. These areas were selected on the basis of their history as concentration points for doves during the fall and winter hunting seasons. Landowners from whom the areas were leased were compensated by the Commission for planting and maintaining crops which attracted doves. Management of these areas also was a responsibility of the game biologist of the District in which areas were located.

Organized surveys and random investigations of hunter activities on both the all game and dove hunting areas revealed substantial use and enthusiastic appreciation of the areas by sportmen and indicated an expansion of this program may be required to meet the demand in future seasons.

Additional services provided by the Commission's technical staff in managing game on privately-owned land included supervision of establishment and operations of controlled shooting preserves. During the biennium, the Commission revised the regulations which govern the operation of these commerical enterprises to allow the operators greater flexibility in providing the type of hunting demanded by their clientele. While the new regulations allow greater flexibility in the harvest of pen-reared game birds on the licensed shooting preserve, they were designed to preclude the possibility of commercial exploitation of native game bird populations.

The Commission's cooperative raccoon trapping and restocking program was continued under the supervision of a Divison of Game biologist. A total of 2,341 raccoons was distributed through 28 hunt clubs to help restore populations in understocked western counties. Participating clubs picked up stock from supply depots in eastern counties and

Ted Mitchell, Upland Game Restoration Project Leader, inspects a field of Egyptian wheat or grain sorghum, grown by the Wildlife Commission as one of the components of the annual seed mixture distributed free upon request.

transported the animals to release sites in other sections of the state. The Commission then reimbursed the clubs for one-half of the cost of the raccoons.

Management of Commission-Controlled Lands

Management of 31 game lands was a major activity of the Division of Game during the biennium. Principal duties of the area managers and assistants were development of suitable game habitat, protection of game populations and supervision of scheduled hunting and fishing. Development practices included boundary line marking and maintenance, planting and maintaining deer pastures and other wildlife food-producing acreages, and construction and maintenance of roads and trails for hunter access. Protection required continuous surveillance of the areas to preclude unlawful taking of game and the control of predatory species and free-roaming domesticated animals which, if not controlled, could reduce game populations and minimize the effectiveness of the management area program. Supervision of hunting and fishing entailed long hours of day and night duty by the area managers and assistants to ensure equitable opportunity and maximum safety for participating sportsmen.

The managed game lands are divided into four administrative units, each under the direction of a management area supervisor. The major activities and accomplishments of each unit are summarized as follows:

Eastern: Managers-in-residence are stationed at Lake Mattamuskeet and on the Holly Shelter, Croatan and Goose Creek management areas. Other areas included in the eastern unit are Gull Rock, Northwest River Marsh, Angola Bay and the Orton Plantation Waterfowl Refuge.

At Lake Mattamuskeet, two impoundments totaling approximately 1,100 acres, were completed and pumps were installed to control water levels. These and other improvements contributed to an increase in waterfowl numbers and improved hunting. Construction was undertaken in cooperation with the U. S. Bureau of Sport Fisheries and Wildlife.

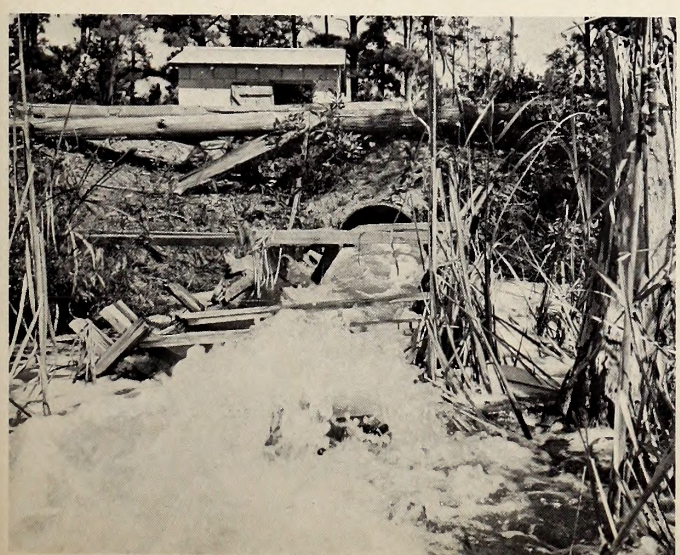
Progress was made in completing the Holly Shelter drainage program with 17,000 feet of right-of-way being cleared and 27,375 feet of canal dug during the biennium. On the Goose Creek area, three new impoundments were completed. The drawdown structure which was completed during the 1966-68 biennium paid large dividends in providing several hundred acres of prime waterfowl area for the past two years. The drawdown feature made possible the seeding of improved varieties of waterfowl plants that produced choice food in greater volume.

Management and maintenance practices on the eastern areas included constructing six miles of roadway, installing seven culverts, grading more than 400 miles of roads, planting 264 acres of upland game foods and mowing and top-dressing approximately 290 acres of pasture. Eighty-one miles of trails were mowed for hunter access. In addition, about 1,300 acres of forest land were control-burned each year and 193 miles of boundary were posted and otherwise maintained.

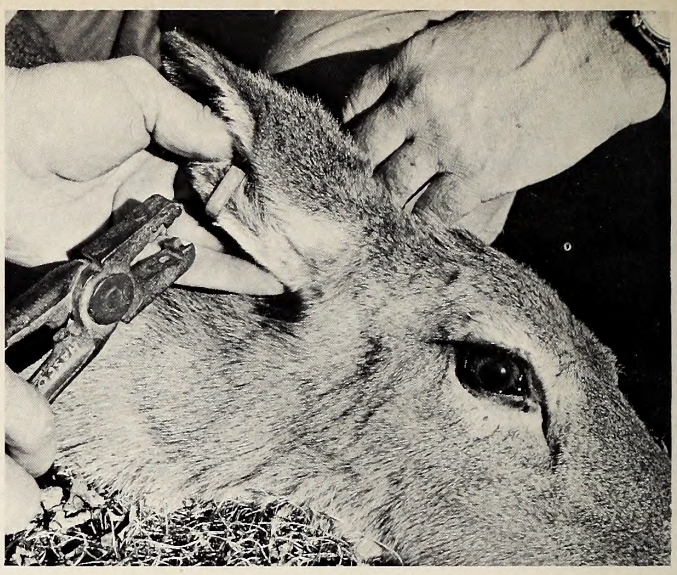
Central: Managers-in-residence are stationed at Caswell, Uwharrie and Sandhills. Management and maintenance of the Cowan's Ford Waterfowl Refuge and the Morris Mountain Game Restoration Area are also responsibilities of this project segment.

A major accomplishment was the construction of two five-acre lakes on the Caswell management area. The land lease agreements were continued with local farmers. Under these agreements, a total of 249.5 acres were leased to cooperators who were required to leave twenty percent of their crops unharvested for the benefit of wildlife. An additional 666 acres of Commission-planted

Gull Rock management area in the eastern administrative unit was managed primarily for waterfowl during the biennium. Pictured is a water control structure.



Small game, quail and rabbits particularly, benefited in the central area from food and cover plantings. The quality of such hunting remained quite high during the biennium.



The Sandhills Wildlife Management Area near Hoffman, continued to be popular with Piedmont sportsmen and provided hunting for doves and other small game as well as deer. Deer were tagged (right) after being trapped on four northern areas to check population densities and movement.

food and cover on this and the other central areas, sustained populations of game that provided hunting for sportsmen who live in metropolitan areas in the central part of the state.

The Sandhills management area continued to serve the sportsmen of North Carolina with its 55,380 acres of multipurpose recreational facilities. Major game species were dove, deer and quail, with other game animals available. Development continued on the 32-mile field trial course, and public use of this course was heavier than any other state-owned field trial course in southeastern United States. Fifty-three acres were planted in peach trees under lease agreement with a private grower on the Sandhills area. Under terms of the lease wildlife habitat improvement plantings were also established on the land by the lessor.

To improve small game habitat on the Uwharrie management area, ten acres of lespedeza were planted in field borders around the permanent pastures. One hundred nineteen acres of permanent pasture were top-dressed and maintained. Conducting deer hunts on the area continued to be a major activity due to the heavy hunter pressure exerted on this area.

Fifteen acres of woodland were cleared on the Cowan's Ford area and plantings of fescue, rye grass, and orchard grass were established. Thirty acres were cultivated and maintained in waterfowl food plantings to provide food for wintering waterfowl on Lake Norman.

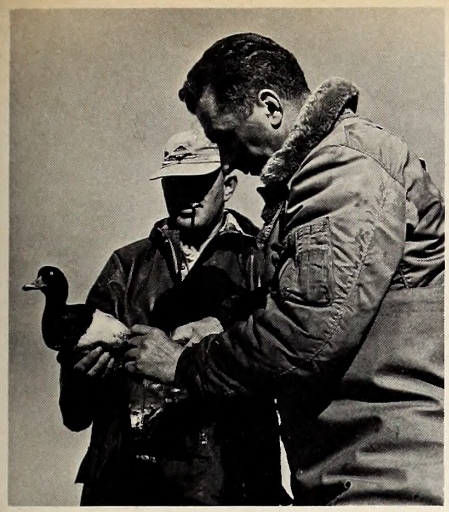
Northern: Managers-in-residence are stationed at Thurmond Chatham, Mount Mitchell, South Mountains, Flat Top, Rich Laurel and Harmon Den. On these areas, planting 243 acres of game food in fields and on logging roads and maintenance of 850 acres in herbaceous growth by mowing, fertilizing and removal of rocks were major contributions to the production and maintenance of high game populations. Judicious control of stray dogs and other predators also contributed to the success of operations. To expedite access for hunters and fishermen, 125 miles of trail were cleared and marked. Road work on the areas consisted of installing two low-water bridges, installing 64 metal culverts, grading 148 miles of roadbed and graveling 17 miles of road. The Flat Top area was expanded by leasing a 370-acre tract of adjacent land. Boundaries of this land were located and marked for inclusion in the management area.

During the second year of the biennium, a complement of heavy equipment and a three-man crew of operators were assigned to the northern segment. Construction and maintenance operations were conducted by this crew on game lands in the western one-half of the state. Northern area personnel trapped and tagged deer in connection with studies of population densities and movements on four areas. They also assisted in transferring animals used to stock recently-acquired game restoration areas.

Western: Managers-in-residence are located on Pisgah, Sherwood, Caney Fork, Wayah Bald, Standing Indian and Santeetlah. Four unmanned game restoration areas—Green River, Beaverdam, Toxaway and Blue Valley—were also operated by the western segment. Protection of game populations from poaching and decimation by free-running dogs were primary functions of personnel on these areas. These activities coupled with maintenance of 502 miles of road and 371 miles of trails provided big game hunters with some of the finest quality recreational opportunity available. Game habitat improvements on these areas included 256 acres planted and 394 acres maintained in pasture by mowing and other means. Another important operation was maintenance, through posting and painting, of 340 miles of boundary lines. As was the case on other Commission-controlled management areas, conducting managed hunts and fishing was a time-consuming but rewarding service to the sportsmen of North Carolina.

Waterfowl Surveys and Management

Waterfowl populations continued at high levels during the biennium with many species reaching



Waterfowl banding aided in following the travel patterns and population changes. Hunters were urged to return any bands recovered. Such projects were often cooperative ventures.

Forest management on game lands included many practices designed to enhance the timber land for wildlife species. Den trees were left to benefit squirrels and other tree-dwellers, mast-producing trees were spared, and cutting was often done to increase the "edge effect" as shown above.

population levels far above their long-term averages. With the increasing size of the wintering flocks, the duck kill increased to acceptable levels following several years of record low kills.

In addition to conducting waterfowl population surveys, the waterfowl biologist coordinated the migratory game bird banding program in cooperation with the United States Fish and Wildlife service and the Altantic Flyway Banding Committee. Under his supervision, Commission personnel banded more than 2,000 birds. Both of these survey projects are part of a continuing study of migrations, annual survival, differential vulnerability and other factors relating to waterfowl management.

The mosquito-control waterfowl-impoundment program, conducted on the Goose Creek management area in cooperation with the Beaufort County Mosquito Control Commission, is nearing completion. Two impoundments were completed, one on Smith Creek and one on Hunting Creek, and are now open to public hunting. The remaining site at Campbell's Creek is under construction and is 90 percent completed.

Deep inroads into prime waterfowl habitat in eastern wetlands continued as a result of private and federally-sponsored drainage programs. In efforts to curtail this destruction, the waterfowl biologist and other technical personnel on the Commission's staff conducted surveys of several projects to assess and report damages to wildlife. While these efforts resulted in obtaining some mitigation for major habitat losses in federally-sponsored projects, they also point up the need for greater and continuing effort to prevent further irreparable damage to an important component of the environment.

Forest Management on Game Lands

The eight state-owned game lands managed by the Wildlife Resources Commission comprise 176,557 acres of land of which 123,590 acres are forested. These forest lands were managed by three professional foresters, aided by four sub-professional assistants. In managing these forest lands, silviculture practices and harvest were oriented for compatibility with wildlife needs. Den trees were retained to benefit squirrels and other forest wildlife; mast-producing trees were left to provide sustenance for deer, bear, wild turkeys and squirrels, and controlled burning was done, on areas where practicable to promote the production of native legumes for use by quail and to safeguard against game- and timber-killing wildfires.

During the biennium, 27 regular sales and 46 salvage sales of timber and pulpwood from the areas produced an income in the amount of $326,626.33. This computes to an average income of $2.64 per acre for all forest land and represents a nominal increase over the income realized during the previous biennium.

A massive ice storm descended on the Sandhills area in February 1968 causing extensive breakage and uprooting of timber. To preclude critical adverse effects on growing timber by insect infestation and disease, immediate removal of damaged trees was imperative. In an aggressive salvage operation, 1,162,975 board feet of sawtimber and 9,378 cords of pulpwood were harvested and sold.

In conformance with G.S. 105-296.1, 15 percent of gross receipts from the sale of forest products was paid in lieu of taxes to counties in which the wildlife management areas are located.

Wild Turkey Restoration

The wild turkey restoration program made important progress during the biennium under the supervision of a biologist who was assisted by other Commission personnel. The experimental habitat improvement program on the Standing Indian Wildlife Management Area was continued and expanded through treatment of 12 new fields, and the second treatment of herbicides was applied on 21 previously treated forest openings. Preliminary findings in this study, combined with information gathered in investigations conducted on other man-

HARVEST OF GAME ON GAME LANDS WITH CHECK STATIONS—1968-69 and 1969-70

AREA	*Bear*	*Boar*	*Deer*	*Squirrel*	*Grouse*	*Raccoon*	*Rabbit*	*Quail*	*Dove*	*Ducks*	*Geese*	*Turkey*
Santeetlah	5-13	76-11	70-64		0-1	36-27						
Fires Creek			119-89	14-0	88-29	12-8						
Standing Indian			218-84	58-12	59-85	28-64						0-1
Wayah Bald			106-33	25-4	37-70	27-34						0-1
Sherwood	3-2		164-121	0-19	15-17	6-0	6-106					
Pisgah	4-6		316-243	545-88	43-30	168-153	9-0	1-0				
Harmon Den	1-0		29-22	12-2	1-4							
Rich Laurel			62-22	31-0	50-10							
Flat Top			126-42	48-3	26-14	3-9						
Mt. Mitchell	2-0		146-68	16-12	0-1	22-16						
Daniel Boone			229-103	143-290	6-4	40-56						1-4
Thurmond Chatham			123-33	0-31	0-8		0-1					
South Mountains		0-3	40-38	49-1	2-2	35-18			67-0			
Uwharrie			207-84	268-352			36-1	0-33				
Sandhills			211-91	5-3			0-50	1025-1302	7926-5117			
Holly Shelter	3-3		119-55									
Croatan	3-0		27-0									
Lake Mattamuskeet										1543-2534	301-343	
Annual Totals	20-25	76-14	2312-1192	1214-817	327-275	377-385	51-158	1026-1335	7993-5117	1543-2534	301-343	1-6
Biennial Totals	45	90	3504	2031	602	762	209	2361	13110	4077	644	7

agement areas, indicate that the mountainous sections of western North Carolina have great potential for restoration of wild turkey in areas where protection is provided and management can be applied.

Studies of population dynamics on 17 selected management areas indicated that turkey populations are increasing on six areas, decreasing on four and holding their own on seven areas. Spring gobbler counts and track-counts-in-snow were among the techniques used in estimating population trends. A study of wild turkey food habits through examination of 63 digestive tracts was conducted during the biennium, as was an investigation to determine levels of parasite infestation in the viscera of 94 birds. Specimens were provided by hunters.

Five Commission-controlled wildlife management areas were inspected and evaluated by the turkey biologist for suitability as wild turkey restoration areas. The Croatan area appeared to offer the greatest potential for management of the species at the present time.

Turkey live-trapping continued on well-stocked areas to obtain foundation stock for release on other areas which afford suitable habitat but support no wild turkey populations at present. During the biennium, 14 turkeys—10 adult males and 4 adult females—were captured and released on the Pisgah (10) and Mount Mitchell (4) wildlife management areas. These birds were captured by use of a recently perfected technique involving the use of bait treated with a tranquilizing drug which renders the birds immobile, but unharmed, for the period of time required to transport them to the

The wild turkey restoration program made important progress during the biennium, with valuable information obtained which will be applied to the management of this important but dwindling game bird.

Number and Distribution of Hunting Dogs in North Carolina

Type of Dog	State Totals	Number in Each District								
		1	2	3	4	5	6	7	8	9
Deer	46,662	7,054	14,462	5,211	6,951	3,424	5,267	4,087	103	103
Bear	7,172	1,114	679	—	—	387	47	—	1,496	3,449
Boar	5,540	—	—	—	—	354	1,649	—	884	2,653
Squirrel	42,621	2,536	3,717	3,772	5,349	7,544	5,856	4,786	5,967	3,094
Dove	4,069	313	833	730	313	783	627	53	260	157
Quail	72,281	3,556	4,799	12,691	6,324	18,459	10,848	7,480	5,999	2,125
Rabbit	205,722	19,708	18,597	33,924	32,833	25,160	17,507	7,653	35,014	15,326
Fox	21,485	1,003	1,558	3,173	2,894	3,227	2,172	1,390	3,842	2,226
Raccoon	31,766	1,258	2,258	2,989	3,824	3,983	3,564	3,040	4,507	6,343
Totals	437,318	36,542	46,903	62,490	58,488	63,321	47,537	28,489	58,072	35,476

release sites. This capture method is superior to the formerly-used net trapping system as it permits examination, banding and transportation without undue stress being placed on the birds. It also helps assure that they will be released in good physical condition, prepared to make the transition from familiar range into a strange, new environment.

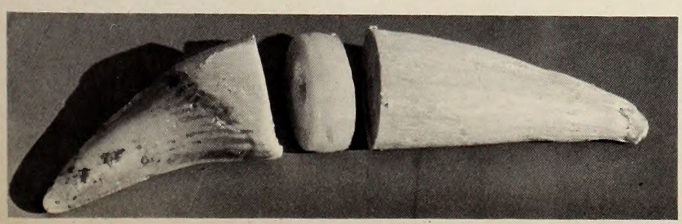
In long-range planning for restoration of the wild turkey on suitable areas throughout North Carolina, all wooded tracts of land 2,000 acres or larger were located from aerial photographs and delineated on county maps from which a composite state map was prepared, showing occupied and potential turkey range.

Game Surveys and Investigations

Under the supervision of a research project leader, the Division's game biologists maintained a continuing check on breeding populations of game species throughout the state. Surveys and investigations of bobwhite quail and mourning dove population trends were given special attention, since data on these heavily hunted species are the basis of hunting season regulations.

Studies of the population dynamics of the various game species were continued during the biennium. An investigation into the productivity of white-tailed deer herds showed the impact of a stabilized food supply on the size of the fawn drop. Those deer herds with fluctuating food supplies experienced considerable year-to-year variation in the number of fawns born. However, those deer herds with a stabilized food supply produced fawn crops at the same level each year.

Black bear studies implemented during the biennium included the aging of bears by inspection of canine teeth which had been sectioned. Quail crop contents were analyzed to determine seed varieties eaten.



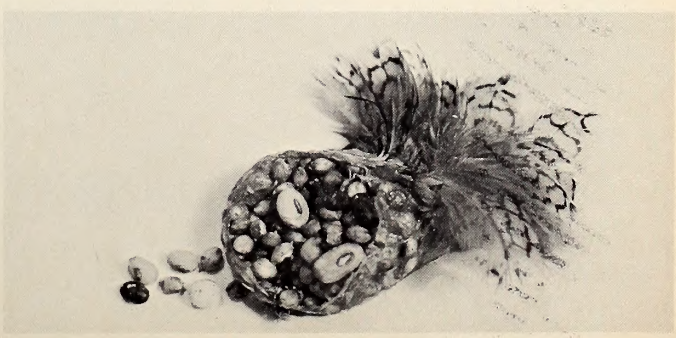
Several studies on the black bear were implemented during the biennium. These studies included delineating the presently occupied black bear range and potential unoccupied black bear range. Another segment included a study of the reproductive characteristics of the black bear and a third segment dealt with hunting methods used by Tarheel hunters.

A study of the use and geographic distribution of hunting dogs was completed. These data are presented in the following table:

Number and Distribution of Hunting Dogs in North Carolina

Biologists continued to monitor the well-being of deer herds throughout the state by collecting data on survival rates, sex ratios and productivity. These data were used to evaluate the condition of each herd and served as the basis for formulating regulations. In the face of predicted low productivity of deer herds in the piedmont and mountains no either-sex deer hunts were scheduled for either year of the biennium.

During the biennium two short-term studies were implemented. One of these studies was designed to evaluate the impact of intensive hunting on grouse in small woodlots in the western part of the state. This study, when completed, will serve as a source of valuable management information for a wildlife resource that could support a greater recreational use. The second study dealt with the biological effect of regulation changes upon squirrel populations. When completed it will provide an insight into the impact of various opening dates on squirrel populations.



Division of Education

In addition to its value as a source of outdoor recreation, an annual business value of $200 million, and its incalculable aesthetic value, wildlife resources have acquired a more recent, vital value. The tissues of birds, mammals, and fish are the only present sources of information on the amount of poisons being absorbed into the bodies of human beings as a result of abuse to our environment.

It is the prime function of the Division of Education to bring about a public awareness of all of these values, and to obtain public cooperation in carrying on a sound, progressive wildlife conservation program. To implement this function, four major activities were carried on: publication, audio-visual aids, news communications, and extension.

PUBLICATIONS

In an age of electronics, instant replay, and the reaching of mass audiences through aural and visual means, the printed word is still the most effective and far-reaching means of communication with large numbers of people. The others serve their purpose, and serve it well; but once a television or radio program, or a motion picture film is over, there is little chance of the audience involved seeing it again. The printed word, however, is as permanent as the material upon which it is imprinted.

The magazine you are now reading is by far the most important and effective means of reaching large numbers of people who might be willing to give serious consideration to the importance of using wildlife and related natural resources wisely.

During the biennium the average monthly paid circulation of WILDLIFE IN NORTH CAROLINA was above 100,000 with a potential readership of nearly 700,000 people.

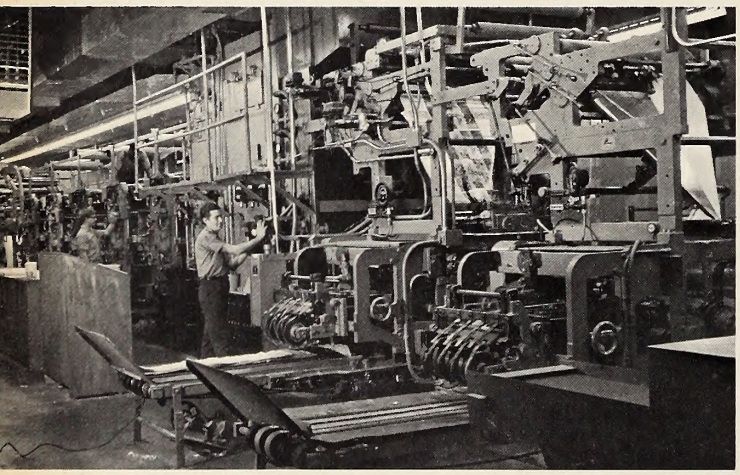
Effective July 1, 1969, the subscription fee for WILDLIFE was increased from $.50 per year to one dollar. Despite this 100 percent increase in cost to the subscriber, there was no significant decrease in total circulation.

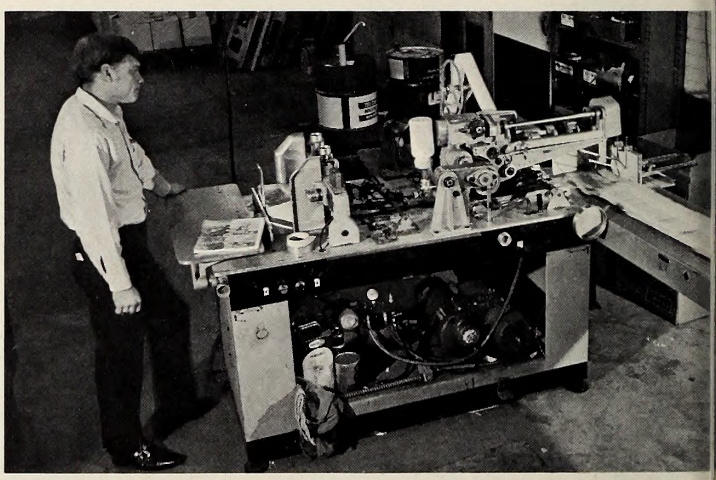
In addition to the magazine, thousands of pamphlets and bulletins were distributed free of charge to persons requesting them. These were informative but nontechnical publications designed for classroom use, and most of the requests came from school teachers and their students. Altogether, nearly 50 different types of pamphlets and bulletins were distributed to thousands of persons requesting them.

AUDIO-VISUAL AIDS

Combined, radio and television probably reach more people than does the printed word, but the

A new high-speed offset press was installed by Graphic Press of Raleigh, printers of "Wildlife in North Carolina." New techniques were also developed to speed up mailing processes.

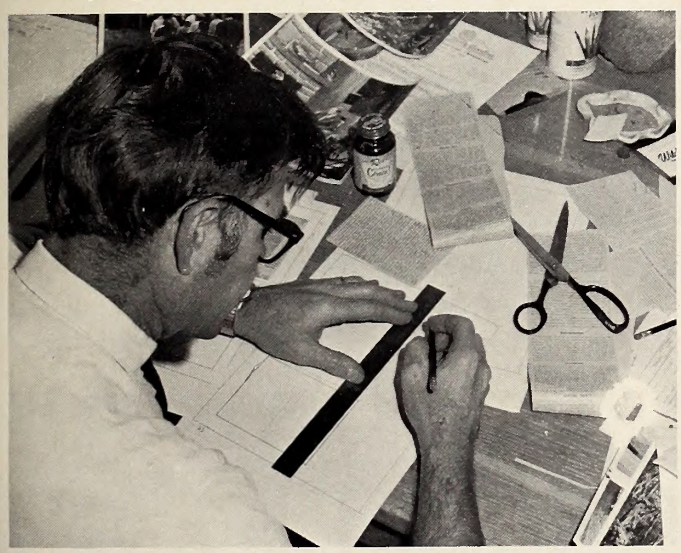




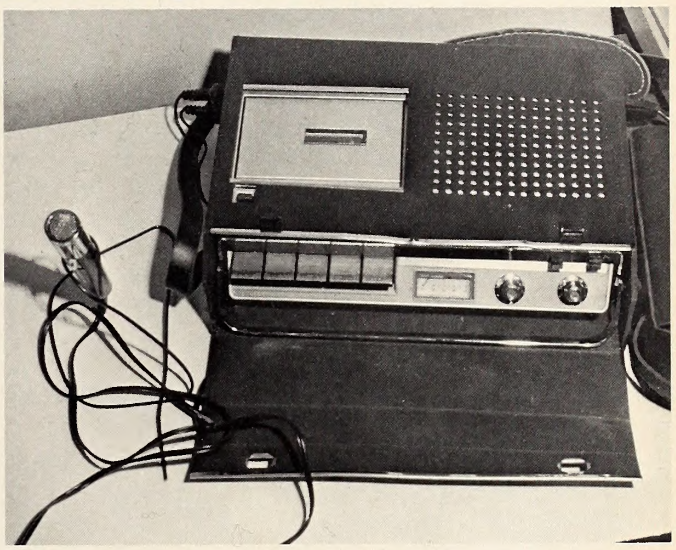
Many methods and procedures were used to place wildlife conservation information in the hands of the public. Shown here are a few of the items offered during the biennium by the Division of Education.

total impact of these, where an educational program is concerned, has never been accurately measured. However, in the belief that many people can be reached who may not be exposed to various publications, a total of 26 half-hour television programs were produced by Commission personnel, and these were aired by the State's educational television network and many of the commercial broadcasting stations. Air time was furnished gratis by stations using the program; and during the second half of the biennium, production costs were reduced to a minimum by the cooperation of WTVD-TV, Durham, which produced the show without cost to the Wildlife Resources Commission. While it is impossible to measure the impact of these programs on the public, general reaction to the shows has been gratifying and the program is expected to be continued.

Despite the growing popularity of television during the past several decades, there are more radio sets in use currently than ever before. Nationwide, there are almost as many radio sets in use as there are people. This means that radio is still an excellent way of reaching large numbers of people effectively and inexpensively. During the biennium 110 weekly radio programs were produced, transcribed, and aired by 20 stations located strategically across the state. These stations gave the Commission free air time as a public service. This, plus air time donated by television stations, amounted to well over $150,000 per year had the Commission had to buy equivalent time at the commercial rate.



A great deal of time went into the production of the Wildlife Commission's magazine. Although the price of the magazine had to be increased from $.50 to $1.00 a year during the biennium, no significant decrease in circulation was noted. At the close of the biennium, circulation was 105,000.



A weekly radio program, produced and taped in the Commission's Raleigh offices, was distributed to some 20 stations over the state. Air time was provided free on a public service basis. Division personnel also participated in many radio programs of the interview type.

The Commission's television program entitled "Wildlife in North Carolina," continued through its third season and production began on the fourth, 13-program series. Color telecasting began for the first time during the biennium. Prime viewing time still was a problem since airing was done on a public service basis; air time cost the Commission nothing. Production by WTVD, Durham, was done at no cost to the Commission.

Motion picture films are still a very good means of presenting the wildlife conservation message to a wide variety of audiences. They serve as entertaining and educational programs for groups ranging from civic organizations to sportsmen's clubs to classrooms in elementary schools. During the biennium some 7,200 motion picture film prints were sent to organized groups with an estimated total audience of 216,000 people.

Color slides are an excellent means of adding to the interest and value of technical and nontechnical lectures to groups of many kinds. Several series of slides were developed on a variety of subjects for use by field and office personnel in presenting programs to organized groups.

THE PRESS

During the biennium excellent cooperation was received from newspapers and the news departments of radio and television stations throughout the state, and in some cases, from neighboring states. North Carolina has 204 daily and nondaily newspapers, 24 commercial and educational television stations, and 65 radio stations. To these were sent 75 news releases covering various activities of the Commission, and as measured by the use of a clipping service, the response was satisfying. It was, however, impossible to measure the use by radio and television stations except by word-of-mouth and correspondence.

In addition to formal press releases there were 220 feature columns. These were prepared weekly; one for the Associated Press, and the other to afternoon daily papers, weekly papers, and several radio stations.

PHOTOGRAPHY

Thousands of feet of color motion picture film was exposed for use in television production and eventually a motion picture for distribution to schools and organized adult groups. To supply the needs for illustrating WILDLIFE IN NORTH CAROLINA, and requests from newspapers and other publications, hundreds of rolls of black and white and color film were exposed. Requests for prints of these came from all over the country and from a variety of publishers and publications.

EXTENSION

Limits of time and personnel made it impossible to meet all of the demands for personal appearances at various meetings of civic and wildlife clubs, plus work in classrooms. Personnel of the Division of Education and other divisions, however, made hundreds of appearances at these groups, and worked intensively with summer youth camps attended by several thousands of young people. Personnel also worked closely with leaders of such organizations as 4-H, Future Farmers of America, and Scouts in planning conservation programs. They also cooperated with making plans for incorporating conservation teaching into elementary and high school curricula.

BOATING SAFETY

During the second half of the biennium the major responsibility for boating safety was transferred to the Division of Motorboats and Water Safety. Nevertheless, each issue of the magazine contained an article on boating and boating safety, and this subject was emphasized in news releases, news features, and radio and television programs. The Division of Wildlife Protection organized water safety demonstration teams that performed at busier marinas and boating access areas. These combined efforts effected an encouraging reduction in the number of boating accidents and fatalities.

HUNTING SAFETY

Compared to many other states, North Carolina has had a relatively low hunting accident rate. It is felt that hunter safety demonstrations by Commission personnel in the field and the wide distribution of educational articles and pamphlets contributed greatly to this record.

DISPLAYS AND EXHIBITS

Seasonal requests for displays and exhibits again exceeded the supply, but as many requests for these as possible were filled. The most popular and educational exhibit was that held at the State Fair where hundreds of thousands of Tarheels were given an opportunity to study close at hand birds, mammals, fish, and reptiles.

The Wildlife Commission's State Fair exhibit, designed by Darrell E. Louder of the Division of Inland Fisheries, continued to be a tremendous drawing card and helped tell the wildlife conservation story.

Division of Motorboats and Water Safety

The Division of Motorboats and Water Safety is the newest of the Wildlife Resources Commission's divisions. It was created in September of 1969, to devote full attention to providing services for boaters and promoting water safety generally.

The growth in the popularity of boating has brought with it an increased need for boating access areas, waterway marking, and stream clearance for improved navigation. These, and other responsibilities of the Motorboat Division are detailed below.

BOATING ACCESS AREA PROGRAM

Perhaps no other boating-related program provides as much of a service for as many boaters as the boating access area program. This division is currently operating 100 access areas where boaters may launch and recover their vessels without the payment of any launching fees. These areas extend across the state from Lake Hiwassee to Kill Devil Hills, and provide boating opportunities to fresh and salt-water fishermen, sightseers, skiers, hunters, and many others.

Each access area has at least one paved launching ramp—some have two—and a well-surfaced parking lot. Most have docks for the boaters' convenience in launching. We are pursuing a development program whereby several areas have been equipped with night lights and toilet facilities. As funds are available, and as public interest dictates, additional areas will be developed further.

We are constantly looking for new locations where access areas are needed. Very often the need for an area is expressed by local residents. After receiving a request to locate an access area, division personnel make a site investigation to determine whether any suitable property is available. If land is available, a feasibility study is conducted to determine whether the site can be acquired and developed at a reasonable cost. Funds for access areas come from the motorboat registration fee and from the small portion of the state tax on gasoline which was allocated to the Wildlife Resources Commission by the 1969 General Assembly.

Once it has been determined that a site is available and can be developed reasonably, the division chief recommends to the Wildlife Resources Commission, at an official meeting, that the property be acquired. The actual acquisition is handled for the Commission by the North Carolina Department of Administration.

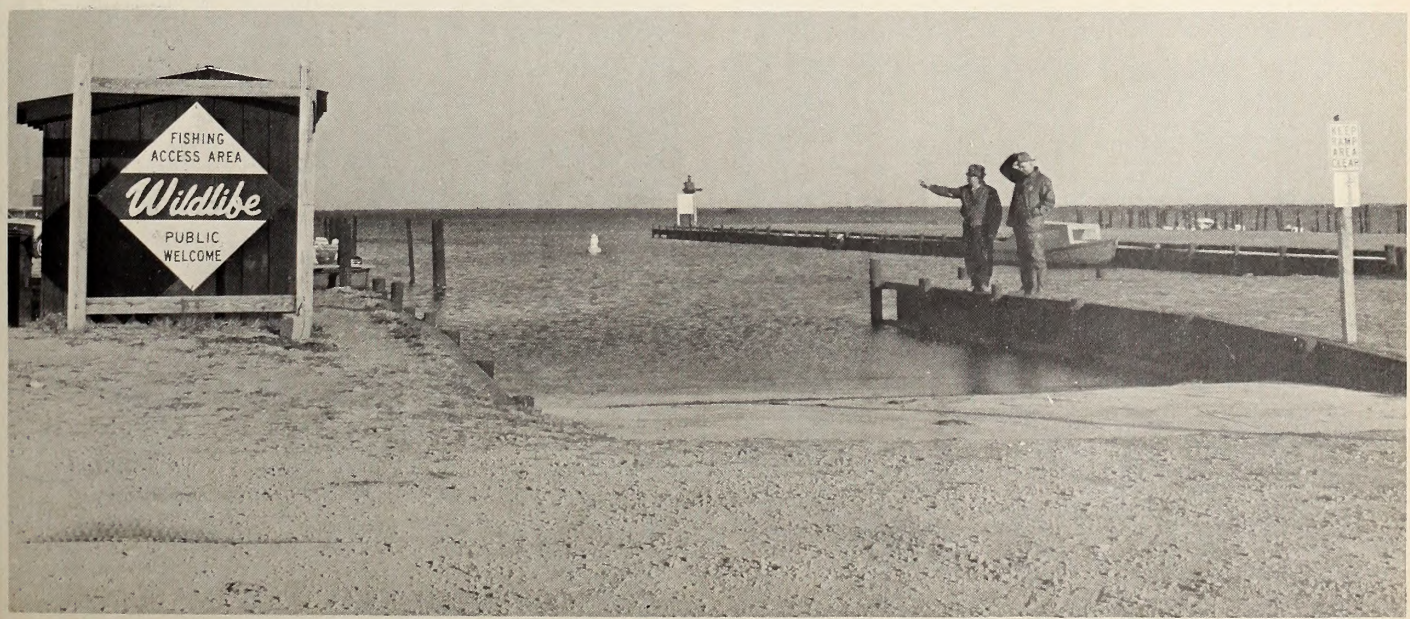
After a proposed access area site becomes the property of the Commission, it is placed on a list with other properties for development as funds become available.

Through this process of careful selection of access area sites, and well-planned construction, we are able to provide the boater with maximum service for his boating dollar.

During the past biennium this division developed ten access areas at the following sites:

Badin Lake—Beaver Dam—Montgomery County
Blewett Falls Lake—Grassy Island—Richmond County
Cape Fear River—Tarheel—Bladen County
Currituck Sound—Poplar Branch—Currituck County
Hickory Lake—Gunpowder—Caldwell County

The boating access area program continued to expand during the biennium and the responsibility for construction and maintenance was placed under the new Division of Motorboats and Water Safety. Shown here is the Poplar Branch area on Currituck Sound, which receives year 'round use.



Hickory Lake—Lovelady—Caldwell County
Intracoastal Waterway—Ocean Isle—Brunswick County
Intracoastal Waterway—Snow's Cut—New Hanover County
Little River—Troy—Montgomery County
Lumber River—High Hill—Robeson County

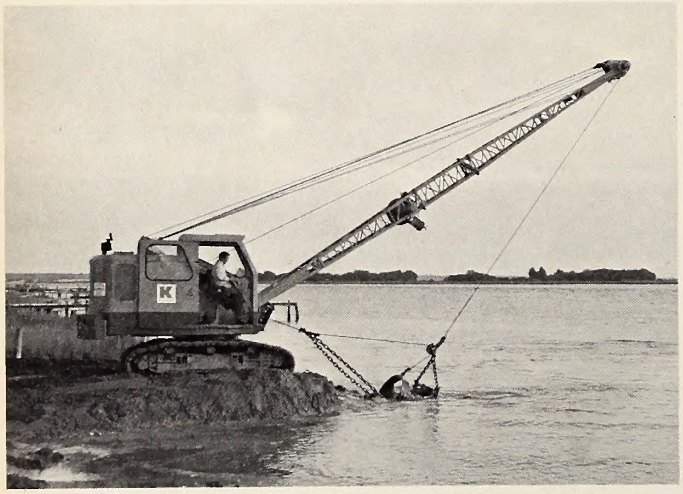
We also acquired several sites for future development, in the following locations:

Northeast Cape Fear River—Sawpit Landing—Pender County
Pee Dee River—Anson County
Pee Dee River—Richmond County
Santeetlah Reservoir—Avey Creek—Graham County
Tennessee Creek Lake—Jackson County
Wolf Creek Lake—Jackson County

In addition to acquiring and constructing access areas, a lot of time, effort, and money was spent on maintenance. Much of this maintenance was routine in nature, such as scraping roads and parking lots, mowing grass, repairing ramps, and rebuilding docks. Too much time was spent replacing signs destroyed by vandalism, and removing trash strewn by careless or unthinking access area users.

During the biennium three engineering technicians were employed, one in each geographical area of the state, who supervised access area maintenance and development. We also had a well-equipped construction crew which performed most of the road and parking lot scraping and grading.

Our construction crew was used extensively in the biennium on access area construction, working under the supervision of the engineering technicians. We found that we could build access areas more economically by using our own crew and equipment when possible. Some construction projects were so large or difficult in nature that we had to contract with private firms; when this was done, division personnel provided on-the-job supervision and coordination.



WATERWAY MARKING

This biennium saw the beginning of the division's program of waterway marking, utilizing the Uniform State Waterway Marker System. As a start, fifty "no wake" buoys were purchased for installation at selected boating access areas. These "no wake" buoys serve to warn boaters to reduce speed when approaching a launching area, and to reduce the danger of property damage caused by high wakes.

Experimental placement of buoys was made on several of the reservoirs created by power companies. These experimental buoys showed us the effect of rapid rise and fall of water levels, and helped us devise methods of insuring that the buoys would stay where they were placed, rather than drifting off into the lake. Plans were made for an expanded waterway marking program and as funds become available this division will mark the underwater shoals, snags, and other hazards to boaters in our public waters.

WATERWAY CLEARING

The waterway clearance or snagging program was active during the biennium as many miles of inland fishing waters were reopened to navigation.

Wildlife Commission equipment is used whenever possible on construction of boating access areas. Development plans are drawn up to provide adequate car and trailer parking plus suitable boat launching ramps. Keeping these areas clean and trash-free is a tremendous task. As shown below, many areas provide access for sports other than fishing. This hunting party has returned to the Poplar Branch site.

A specially trained, well-equipped stream clearance crew worked at removing logs, treetops, and other hazards to navigation. Much effort was made to identify waters in need of clearing, and setting up a long-range plan to get the work done.

The magnitude of the problem of waterway clearance makes it difficult to show large-scale results with a single crew; however, we have been able to provide a service to boaters in certain sections of the state.

LOCAL WATER SAFETY COMMITTEES

In addition to the programs of boating access areas, waterway marking, and waterway clearing, which provide direct services to our boating public, this division worked with local water safety committees during the biennium to make our waters safer. As a result of House Bill 1225, which was passed by the 1969 General Assembly, many local units of government chose to set up local water safety committees to study problems at the local level. These local committees have made recommendations to the Wildlife Resources Commission for local regulations to promote safety for boaters and other water users. Technical assistance was supplied to local committees. The division chief assisted these committees in formulating proposed regulations for consideration and adoption by the Wildlife Resources Commission which would contribute to safety without imposing undue hinderances on boaters and other water users. Local committees were established this biennium for Lake Gaston, White Lake, Lake Waccamaw, Lake James, and Onslow County.

Providing easier navigation by stream clearance was the responsibility of the Commission's snagging crew. Selected streams were cleared of trees and logs which hindered fishing and boating. Only those obstructions which make fishing and boating difficult were removed; fish-sheltering items were left.

NORTH CAROLINA WATER SAFETY COMMITTEE

During the last week of the biennium, Governor Robert W. Scott announced the appointment of the North Carolina Water Safety Committee. This statewide committee is to function "as a continuing advisory and coordinative body with respect to the activities of the various public and private agencies, organizations, corporations, and individuals with responsibilities or interests relevant to the maintenance of an effective program of water safety in North Carolina."

BOATING ACCIDENT REPORTS

This division received and analyzed reports of boating accidents which resulted in death, one hundred dollars or more in property damage, or incapacitation of an individual for a period of 72 hours or more. By studying these accident reports, we are able to identify situations which are likely to cause accidents, and identify certain bodies of water which have high accident rates.

During the biennium 233 boating accidents resulted in 126 deaths, and many thousands of dollars in property damage.

Although enforcement of boating regulations is a function of the Division of Protection, boating accident reports were maintained and reviewed by the Division of Motorboats and Water Safety. Combined efforts of accident analysis, boating safety education, and increased public cooperation will help eliminate problems like the reckless operation shown.

• continued from page 5

PERSONNEL

The average number of permanent positions in the Commission was 325. These included 165 enforcement officers, 37 refuge personnel, 31 biologists, 5 education specialists, 7 engineering technicians, 20 hatchery employees, 3 foresters, 8 administrative personnel, 39 clerical employees, and 10 other nonprofessional employees.

During the biennium, personnel services included the processing of applications for employment, the preparation of forms for submission to the N. C. Personnel Department and the Budget Division of the Department of Administration to effect changes in employee classification, salary grade, salary range; automatic, merit, longevity, and legislative salary increases; transfers, separations, payrolls (including payroll deductions), leave of absence, and employee insurance.

DATA PROCESSING

During the past biennium, data processing equipment played a vital part in maintaining license agent accounts, monthly subscription lists for the Commission's magazine, WILDLIFE IN NORTH CAROLINA, and registering motorboats.

The motorboat registration procedure was changed to provide better service to boat owners. Instead of using a renewal postcard for re-registering numbered motorboats as in the past, the Commission converted to a system that utilized a renewal application card. This made it possible for the Commission to print motorboat registration certificates prior to the actual time they were renewed and enabled boat owners to receive their certificates much sooner than formerly possible.

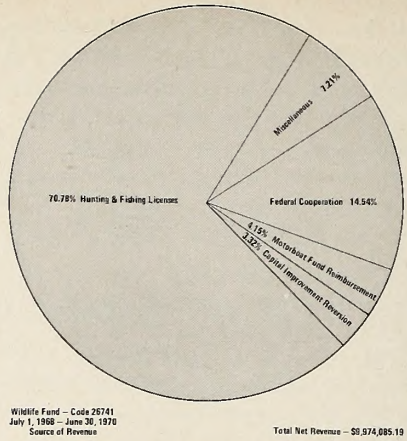
Data processing equipment was used to assist the divisions of Game and Inland Fisheries with several surveys and research projects. Normally this entailed the addressing of questionnaires, purging of names and addresses, punching of data cards, and printing tabulations from collected data.

Data processing equipment and personnel assisted in the preparation of monthly prosecution reports, monthly activity reports, management area hunt reports, Lake Mattamuskeet waterfowl kill data, planting material distribution, and many other functions of the Commission where modern electronic data processing could be used.

WAREHOUSING

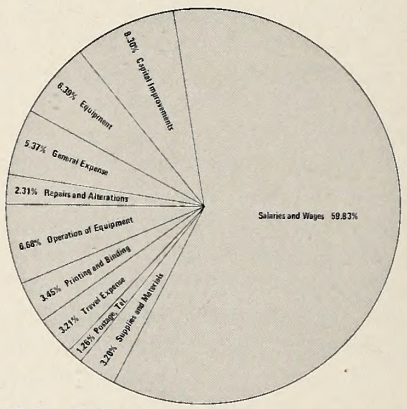
In the fall of 1969, the Commission completed its warehouse storage facility and depot, located on Reedy Creek Road in Raleigh. The warehouse is used to store and distribute uniforms and automotive, boating and miscellaneous supplies. In addition, all new motor vehicles and motorboats are distributed from the warehouse and most surplus property is sold by the Surplus Property Division from our warehouse depot.

For control purposes, a perpetual inventory system was established. An actual count of the inventory on hand each month was reconciled with perpetual inventory controls kept at the warehouse and at the central office of the Commission.



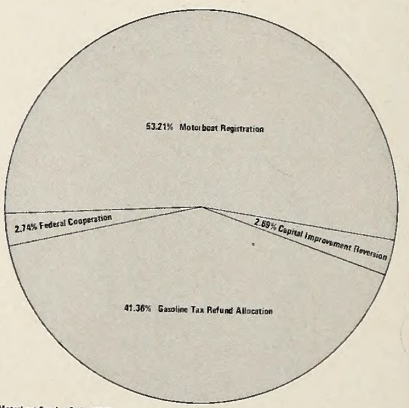
Wildlife Fund – Code 26741
July 1, 1968 – June 30, 1970
Source of Revenue

Total Net Revenue – $9,974,085.19



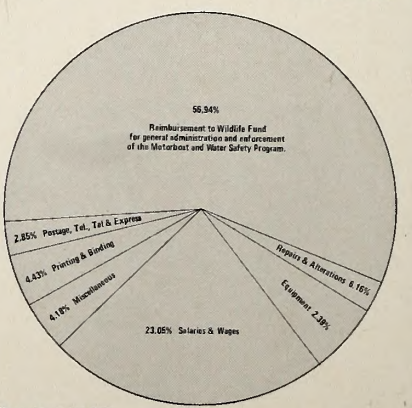
Wildlife Fund – Code 26741
July 1, 1968 – June 30, 1970
Object of Expenditures

Total Net Expenditures – $9,310,337.54



Motorboat Fund – Code 26743
July 1, 1968 – June 30, 1970
Source of Revenues

Total Net Revenue $844,658.04



Motorboat Fund – Code 26743
July 1, 1968 – June 30, 1970
Object of Expenditures

Total Net Expenditures – $727,225.80

WILDLIFE BUDGET—CODE 26741—JULY 1, 1968-JUNE 30, 1970

I. ADMINISTRATION	1968-69	1969-70
Salary — Director	$ 17,750.04	$ 19,419.96
Salaries and Wages — Staff	39,885.35	66,290.15
Postage, Tel., Teleg., & Express	1,200.00	3,936.59
Travel Expense	2,687.76	1,698.88
General Expense	7,029.38	11,000.00
Commission Expense	9,892.93	7,776.42
TOTAL	$ 78,445.46	$ 110,122.00

II. FINANCE AND PERSONNEL		
Salaries and Wages—Permanent	$ 84,726.03	$ 91,137.97
Salaries and Wages—Temporary	2,083.16	8,256.45
Supplies and Materials	4,978.98	2,617.90
Postage, Tel., Teleg., & Express	21,963.31	24,978.40
Travel Expense	272.26	823.04
Printing and Binding	37,891.39	52,701.46
Operation of Equipment	1,051.02	2,686.12
Public Utilities	—0—	994.79
Repairs and Alterations	2,486.53	2,773.85
General Expense	3,117.86	5,979.26
Equipment	2,668.72	5,050.02
Warehouse Stock Inventory	—0—	10,867.17
TOTAL	$ 161,239.26	$ 208,866.43

III. WILDLIFE PROTECTION		
Salaries and Wages—Permanent	$1,156,313.98	$1,311,649.02
Salaries and Wages—Temporary	7,030.00	7,957.08
Supplies and Materials	3,609.16	3,280.46
Postage, Tel., Teleg., & Express	10,863.44	11,538.56
Travel Expense	76,866.89	85,183.72
Operation of Equipment	176,658.26	173,635.00
Repairs and Alterations	—0—	25,399.38
General Expense	—0—	16,997.77
Motor Vehicle Exchange	103,839.54	97,612.68
Equipment	56,544.01	87,070.02
Uniforms	22,839.96	21,421.02
TOTAL	$1,614,565.24	$1,841,744.71

IV. EDUCATION		
Salaries and Wages—Permanent	$ 55,264.00	$ 70,462.82
Salaries and Wages—Temporary	600.00	897.50
Supplies and Materials	7,746.51	5,911.06
Postage, Tel., Teleg., & Express	4,000.00	6,214.41
Travel Expense	4,600.00	3,849.16
Printing and Binding	47,393.94	73,240.01
Operation of Equipment	620.37	793.04
Repairs and Alterations	727.00	429.40
General Expense	5,140.63	5,649.59
Motor Vehicle Exchange	1,497.38	—0—
Equipment	3,027.29	3,250.96
Motion Pictures	494.84	1,115.18
Television Productions	—0—	3,983.88
TOTAL	$ 131,111.96	$ 175,797.01

V. FISH MANAGEMENT ADMINISTRATION		
Salaries and Wages—Permanent	$ 30,414.00	$ 33,798.00
Salaries and Wages—Temporary	585.18	989.83
Supplies and Materials	1,917.90	(3,678.99)
Postage, Tel., Teleg., & Express	399.96	1,061.23
Travel Expense	1,646.37	2,206.13
Printing and Binding	—0—	—0—
Operation of Equipment	1,034.29	1,226.34
Repairs and Alterations	9.83	76.12
General Expense	1,466.00	2,196.69
Motor Vehicle Exchange	—0—	2,000.00
Equipment	539.87	8.90
TOTAL	$ 38,013.40	$ 39,884.25

VI. WAYNESVILLE HATCHERY		
Salaries and Wages—Permanent	$ 25,680.00	$ 20,043.00
Salaries and Wages—Temporary	500.00	374.40
Supplies and Materials	8,819.77	7,942.44
Postage, Tel., Teleg., & Express	134.34	243.54
Travel Expense	574.15	598.86
Operation of Equipment	995.96	1,010.15
Power and Lights	137.70	132.04
Repairs and Alterations	2,342.91	1,481.29
General Expense	50.00	50.00
Motor Vehicle Exchange	1,089.00	—0—
Equipment	290.78	200.00
TOTAL	$ 40,614.61	$ 32,075.72

VII. MARION HATCHERY	1968-69	1969-70
Salaries and Wages—Permanent	$ 25,304.07	$ 25,295.26
Salaries and Wages—Temporary	495.63	256.00
Supplies and Materials	10,471.65	10,690.03
Postage, Tel., Teleg., & Express	262.81	376.77
Travel Expense	713.76	832.43
Operation of Equipment	1,007.28	1,480.03
Power and Lights	324.78	326.60
Repairs and Alterations	4,107.45	1,793.39
Motor Vehicle Exchange	—0—	4,749.56
Equipment	289.20	265.12
TOTAL	$ 42,976.63	$ 46,065.19

VIII. FAYETTEVILLE HATCHERY		
Salaries and Wages—Permanent	$ 16,232.00	$ 14,658.46
Salaries and Wages—Temporary	—0—	563.20
Supplies and Materials	5,751.67	4,653.82
Postage, Tel., Teleg., & Express	305.33	393.56
Travel Expense	908.36	509.17
Operation of Equipment	1,152.71	763.83
Power and Lights	671.33	522.08
Repairs and Alterations	637.95	1,206.63
Motor Vehicle Exchange	1,346.91	—0—
Equipment	236.39	300.00
TOTAL	$ 27,242.65	$ 23,570.75

IX. ROARING GAP HATCHERY		
Salaries and Wages—Permanent	$ 16,372.00	$ 19,120.00
Salaries and Wages—Temporary	195.20	—0—
Supplies and Materials	5,632.00	4,029.98
Postage, Tel., Teleg., & Express	179.55	160.78
Travel Expense	745.23	775.46
Operation of Equipment	805.00	1,201.63
Power and Lights	274.86	399.00
Repairs and Alterations	1,423.75	662.87
Motor Vehicle Exchange	—0—	4,750.00
Equipment	349.11	100.00
TOTAL	$ 25,976.70	$ 31,199.72

X. ARMSTRONG HATCHERY		
Salaries and Wages—Permanent	$ 30,749.00	$ 30,049.20
Salaries and Wages—Temporary	1,036.05	1,980.40
Supplies and Materials	6,952.94	5,408.69
Postage, Tel., Teleg., & Expense	520.35	897.35
Travel Expense	1,298.21	1,394.38
Operation of Equipment	4,164.50	3,052.93
Power and Lights	482.10	459.35
Repairs and Alterations	527.84	788.44
Motor Vehicle Exchange	3,183.05	3,150.00
Equipment	259.64	498.38
TOTAL	$ 49,173.68	$ 47,679.12

XI. TABLE ROCK HATCHERY		
Salaries and Wages—Permanent	$ 11,924.00	$ 11,076.00
Salaries and Wages—Temporary	591.20	716.80
Supplies and Materials	1,053.73	715.52
Postage, Tel., Teleg., & Express	167.47	193.94
Travel Expense	578.16	523.06
Operation of Equipment	1,492.77	1,754.46
Power and Lights	139.84	126.80
Repairs and Alterations	656.23	638.93
Motor Vehicle Exchange	—0—	—0—
Equipment	221.77	—0—
TOTAL	$ 16,825.17	$ 15,745.51

XII. GAME MANAGEMENT SUPERVISION		
Salaries and Wages—Permanent	$ 19,080.00	$ 21,408.00
Supplies and Materials	30.80	72.93
Postage, Tel., Teleg., & Express	207.07	277.98
Travel Expense	443.96	1,299.89
TOTAL	$ 19,761.83	$ 23,058.80

XIV. LAKE MATTAMUSKEET		
Salaries and Wages—Permanent	$ 7,092.00	$ 7,728.00
Salaries and Wages—Temporary	3,518.05	1,408.60
Supplies and Materials	88.31	189.30
Postage, Tel., Teleg., & Express	499.41	498.77
Travel Expense	188.01	231.86
Operation of Equipment	820.39	962.67
Power and Lights	81.21	99.65
Repairs and Alterations	14.83	188.27
General Expense	250.00	—0—
Motor Vehicle Exchange	—0—	1,200.00
Equipment	992.48	4,154.54
TOTAL	$ 13,544.69	$ 16,661.66

XV. STATEWIDE HUNT MANAGEMENT

	1968-69	1969-70
Salaries and Wages—Temporary	$ 275.50	$ —0—
Supplies and Materials	5,767.31	5,060.88
Postage, Tel., Teleg., & Express	—0—	—0—
Printing and Binding	3,246.75	789.50
General Expense	1,500.00	2,494.56
TOTAL	$ 10,789.56	$ 8,344.94

XVI. SANDHILLS, UWHARRIE, CASWELL AND COWAN'S FORD MANAGEMENT AREAS

Salaries and Wages—Permanent	$ 43,176.00	$ 47,400.00
Salaries and Wages—Temporary	11,548.85	15,558.80
Supplies and Materials	8,279.47	9,085.65
Postage, Tel., Teleg., & Express	814.61	886.40
Travel Expense	2,944.26	2,796.16
Operation of Equipment	6,817.71	9,900.89
Power and Lights	276.73	332.52
Repairs and Alterations	857.14	2,522.60
General Expense	477.50	622.00
Motor Vehicle Exchange	2,500.00	3,789.98
Equipment	4,984.25	—0—
TOTAL	$ 82,676.52	$ 92,895.00

XVIII. STATEWIDE FOREST MANAGEMENT

Salaries and Wages—Permanent	$ 41,999.00	$ 47,216.84
Salaries and Wages—Temporary	8,165.30	9,179.20
Supplies and Materials	1,520.56	2,487.14
Postage, Tel., Teleg., & Express	133.95	259.81
Travel Expense	1,989.77	1,870.90
Operation of Equipment	4,482.22	2,650.15
Repairs and Alterations	232.44	119.78
General Expense	2,540.46	4,213.49
Motor Vehicle Exchange	4,799.89	3,020.99
Equipment	383.92	6,815.07
TOTAL	$ 66,247.51	$ 77,833.37

XIX. WILD TURKEY RESTORATION

Salaries and Wages—Permanent	$ 9,014.00	$ 10,063.83
Salaries and Wages—Temporary	2,335.60	1,740.05
Supplies and Materials	383.17	281.74
Postage, Tel., Teleg., & Express	68.69	121.68
Travel Expense	749.44	994.89
Operation of Equipment	892.15	958.73
General Expense	988.50	270.00
Motor Vehicle Exchange	1,600.00	—0—
Equipment	222.97	448.28
TOTAL	$ 16,254.52	$ 14,879.20

XX. GAME SURVEYS AND INVESTIGATIONS

Salaries and Wages—Permanent	$ 9,384.00	$ 8,218.04
Salaries and Wages—Temporary	1,343.25	3,085.37
Supplies and Materials	450.06	20.19
Postage, Tel., Teleg., & Express	1,110.26	2,486.98
Travel Expense	485.42	438.13
Printing and Binding	413.61	—0—
Operation of Equipment	177.14	329.44
General Expense	170.63	247.00
Motor Vehicle Exchange	—0—	1,479.90
Equipment	198.16	166.29
TOTAL	$ 13,732.53	$ 16,471.34

XXI. GAME MANAGEMENT COORDINATION

Salaries and Wages—Permanent	$ 22,992.00	$ 25,398.00
Salaries and Wages—Temporary	48.00	251.00
Supplies and Materials	360.74	417.41
Postage, Tel., Teleg., & Express	53.70	163.17
Travel Expense	1,111.35	1,254.21
Printing and Binding	—0—	—0—
Repairs and Alterations	33.43	112.71
Equipment	198.16	—0—
TOTAL	$ 24,797.38	$ 27,596.50

XXII. WESTERN WILDLIFE MANAGEMENT AREAS

Salaries and Wages—Permanent	$ 85,776.00	$ 98,489.00
Salaries and Wages—Temporary	11,164.80	13,776.80
Supplies and Materials	5,754.41	4,852.90
Postage, Tel., Teleg., & Express	1,682.90	1,997.97
Travel Expense	3,810.68	4,382.87
Operation of Equipment	10,745.78	11,488.52
Power and Lights	236.44	259.05
Repairs and Alterations	1,579.78	1,443.92
Motor Vehicle Exchange	10,799.80	6,488.38
Equipment	3,935.39	549.30
TOTAL	$ 135,485.98	$ 143,728.71

XXIII. NORTHERN WILDLIFE MANAGEMENT AREAS

	1968-69	1969-70
Salaries and Wages—Permanent	$ 78,000.00	$ 92,394.22
Salaries and Wages—Temporary	14,880.70	17,570.30
Supplies and Materials	9,058.22	10,153.40
Postage, Tel., Teleg., & Express	1,373.31	1,854.85
Travel Expense	3,946.41	4,821.44
Operation of Equipment	8,880.47	18,718.78
Power and Lights	206.88	452.68
Repairs and Alterations	1,346.27	3,384.71
General Expense	—0—	801.15
Motor Vehicle Exchange	6,799.79	15,500.00
Equipment	5,970.83	—0—
TOTAL	$ 130,462.88	$ 165,651.53

XXIV. EASTERN WILDLIFE MANAGEMENT AREAS

Salaries and Wages—Permanent	$ 34,573.00	$ 45,912.00
Salaries and Wages—Temporary	9,666.25	14,652.90
Supplies and Materials	3,987.67	5,172.27
Postage, Tel., Teleg., & Express	616.88	1,068.63
Travel Expense	2,112.96	2,466.83
Operation of Equipment	5,603.53	10,823.50
Power and Lights	117.63	86.42
Repairs and Alterations	2,486.00	1,075.10
General Expense	8,992.42	2,361.77
Motor Vehicle Exchange	2,841.19	10,403.51
Equipment	1,899.77	2,426.26
TOTAL	$ 72,897.30	$ 96,449.19

XXV. UPLAND GAME RESTORATION

Salaries and Wages—Permanent	$ 106,049.89	$ 115,815.00
Salaries and Wages—Temporary	25,738.13	25,917.62
Supplies and Materials	18,692.06	16,597.31
Postage, Tel., Teleg., & Express	1,877.77	2,245.00
Travel Expense	8,045.65	8,198.70
Printing and Binding	—0—	684.57
Operation of Equipment	11,850.32	10,582.65
Power and Lights	165.74	191.75
Repairs and Alterations	283.24	408.85
General Expense	10,093.40	12,621.78
Motor Vehicle Exchange	8,199.85	710.65
Equipment	—0—	5,675.16
Purchase of Raccoons	1,915.00	3,244.50
TOTAL	$ 192,911.05	$ 202,893.54

XXVI. COOPERATIVE RESEARCH

General Expense	$ 12,358.07	$ 6,049.97

XXVII. STATEWIDE WATERFOWL MANAGEMENT

Salaries and Wages—Permanent	$ 9,236.00	$ 10,649.00
Salaries and Wages—Temporary	5,898.85	4,171.20
Supplies and Materials	2,933.25	788.06
Postage, Tel., Teleg., & Express	238.39	267.86
Travel Expense	1,002.20	870.20
Operation of Equipment	1,557.90	1,926.61
Repairs and Alterations	31.25	49.05
General Expense	804.03	588.00
Motor Vehicle Exchange	1,599.32	—0—
Equipment	1,117.83	2,420.04
TOTAL	$ 24,419.02	$ 21,730.02

XXVIII. DATA PROCESSING UNIT

Salaries and Wages—Permanent	$ 37,282.18	$ 44,748.91
Supplies and Materials	2,396.85	2,221.53
General Expense	33,409.64	28,509.16
Equipment	704.76	8,153.87
Salaries and Wages—Temporary-Employee on Loan	—0—	1,257.40
TOTAL	$ 73,793.43	$ 84,890.87

XXX. FISHERIES MANAGEMENT COORDINATION

Salaries and Wages—Permanent	$ 16,167.00	$ 18,265.87
Salaries and Wages—Temporary	134.00	216.13
Supplies and Materials	292.05	221.48
Postage. Tel., Teleg., & Express	47.75	56.95
Travel Expense	196.44	258.37
Repairs and Alterations	28.71	40.37
General Expense	288.91	490.00
Equipment	—0—	—0—
TOTAL	$ 17,154.86	$ 19,549.17

XXXI. FISHERIES SURVEY AND MANAGEMENT

	1968-69	1969-70
Salaries and Wages—Permanent	$ 102,219.90	$ 114,849.97
Salaries and Wages—Temporary	20,467.20	16,838.30
Supplies and Materials	6,150.81	5,589.08
Postage, Tel., Teleg., & Express	2,319.16	2,921.62
Travel Expense	9,707.14	8,145.21
Printing and Binding	106.54	—0—
Operation of Equipment	10,059.85	10,588.86
Power and Lights	27.90	67.85
Repairs and Alterations	51.36	116.93
General Expense	1,448.02	7,215.83
Motor Vehicle Exchange	4,118.68	11,900.00
Equipment	5,668.22	6,752.64
TOTAL	$ 162,344.78	$ 184,986.29

XXXII. LAKE MANAGEMENT STUDY

Salaries and Wages—Temporary	$ 658.13	$ 991.10
Supplies and Materials	352.67	13.82
Postage, Tel., Teleg., & Express	—0—	—0—
Travel Expense	—0—	—0—
Operation of Equipment	—0—	—0—
Power and Lights	57.70	42.90
Repairs and Alterations	—0—	—0—
Equipment	133.09	275.00
TOTAL	$ 1,201.59	$ 1,322.82

XXXIII. POWER RESERVOIR MANAGEMENT

Salaries and Wages—Permanent	$ 8,031.00	$ 9,563.00
Salaries and Wages—Temporary	2,995.90	5,544.00
Supplies and Materials	157.35	168.39
Postage, Tel., Teleg., & Express	68.49	30.16
Travel Expense	236.70	302.22
Operation of Equipment	1,210.50	1,366.16
Power and Lights	11.70	—0—
General Expense	119.34	—0—
Motor Vehicle Exchange	1,375.00	—0—
Equipment	800.61	753.39
TOTAL	$ 15,006.59	$ 17,727.32

XXXIV. RIVERS AND STREAMS PROJECT

Salaries and Wages—Permanent	$ 15,951.55	$ 16,590.01
Salaries and Wages—Temporary	636.80	1,385.60
Supplies and Materials	1,249.77	782.39
Postage, Tel., Teleg., & Express	194.94	129.59
Travel Expense	716.66	945.02
Operation of Equipment	1,567.69	1,574.88
Power and Lights	—0—	—0—
Repairs and Alterations	809.39	212.67
Motor Vehicle Exchange	1,373.00	2,000.00
Equipment	703.71	—0—
TOTAL	$ 23,203.51	$ 23,620.16

XXXV. ENGINEERING

Salaries and Wages—Permanent	$ 50,850.00	$ 21,237.00
Salaries and Wages—Temporary	14,499.80	8,838.40
Supplies and Materials	978.36	727.10
Postage, Tel., Teleg., & Express	756.64	334.97
Travel Expense	10,657.75	4,850.03
Operation of Equipment	31,553.92	8,506.64
Repairs and Alterations	—0—	32,087.48
General Expense	1,000.00	20.00
Motor Vehicle Exchange	19,293.07	—0—
Equipment	22,233.26	215.92
TOTAL	$ 151,822.80	$ 76,817.54

XXXVI. ACQUISITION AND DEVELOPMENT OF LANDS AND WATERS—ENGINEERING

Salaries and Wages—Temporary	$ 10,602.95	$ —0—
Supplies and Materials	3,426.22	—0—
Operation of Equipment	18,533.20	—0—
Repairs and Alterations	72,992.59	—0—
General Expense	891.54	—0—
WILDLIFE PROTECTION		
Repairs and Alterations	$ 23,445.47	$ —0—
General Expense	19,326.69	—0—
EDUCATION		
Printing and Binding	$ 62,474.00	—0—
TOTAL	$ 211,692.66	$ —0—

XXXVII. MISCELLANEOUS REQUIREMENTS

	1968-69	1969-70
Workmen's Compensation	$ 17,824.33	$ 11,700.28
State Retirement	153,505.49	193,884.15
Insurance and Bonding	12,479.80	5,726.45
Counties Share of Timber Receipts	23,981.61	22,989.41
General Expense	11,274.84	11,224.44
Bus Transportation	552.00	595.20
Social Security	103,199.23	118,077.69
Radio Communications	10,509.24	10,417.07
TOTAL	$ 333,326.54	$ 374,614.69

XL. U. S. FOREST SERVICE

Payment of U. S. Forest Service Part of Receipts	$ 75,000.00	$ 75,000.00

XLII. WELDON HATCHERY

Salaries and Wages—Temporary	$ 1,225.60	$ 152.00
Supplies and Materials	99.32	308.72
Postage, Tel., Teleg., & Express	77.40	59.26
Travel Expense	264.53	37.64
Power and Lights	93.50	108.80
Repairs and Alterations	312.17	—0—
Equipment	130.24	200.00
TOTAL	$ 2,202.76	$ 866.42

XLIII. CAPITAL IMPROVEMENT FUND

Transfer to Capital Improvement Fund	$ 425,000.00	$ 266,189.96

LXX. SPECIAL FUND

Acquisition, Development & Management of Lands & Waters	$ —0—	$ 81,743.00
Enlarging, Expanding Activities of the Protection Division	—0—	40,871.00
Enlarging, Expanding Activities of the Education Division	—0—	40,871.00
TOTAL	$ —0—	$ 163,485.00
REFUND OF RECEIPTS AND EXPENSES	$ 183,114.01	$ 143,728.53
TOTAL EXPENDITURES	$4,717,387.13	$4,919,792.95

RECEIPTS

Hunting and Fishing Licenses	$3,164,471.25	$3,893,427.19
Management Area Receipts	83,718.15	144,426.26
Federal Cooperation	609,709.40	839,666.65
Miscellaneous Receipts	8,808.83	10,089.35
Sale of Surplus Property	64,118.70	114,457.74
Sale of Publications	57,241.66	63,010.15
Rent of State Property	9,526.50	9,536.90
Caswell Area Receipts	24,751.48	16,115.00
Reimbursement from Motorboat Fund	201,494.00	212,448.00
Funds Reverting From Capital Improvement Fund	—0—	331,244.73
Payments for Employee on Loan	—0—	186.00
Receipts from Sale of Land	115,637.25	—0—
Refund of Receipts and Expenses	183,114.01	143,728.53
TOTAL	$4,522,591.23	$5,778,336.50

SUMMARY OF OPERATIONS

Funds transferred from preceding year	$ 735,549.24	$ 540,753.34
Gross Receipts for year	4,522,591.23	5,778,336.50
Total Available Funds	$5,258,140.47	$6,319,089.84
Less Expenditures	$4,717,387.13	$4,919,792.95
*Operating Reserve June 30, 1969	$ 540,753.34	
*Operating Reserve June 30, 1970		$1,399,296.89

*This operating reserve is required for meeting payrolls and other obligations during the months of July, August and September each year when revenue from hunting and fishing license receipts is very low.

MOTORBOAT BUDGET — CODE 26743
JULY 1, 1968 - JUNE 30, 1970

	1968-69	1969-70
LXXX. ADMINISTRATION		
Salaries and Wages—Permanent	$ 10,937.00	$ 18,200.00
Supplies and Materials	—0—	98.07
Travel Expense	9.50	451.99
Printing and Binding	—0—	13,759.80
General Expense	455.08	574.20
Equipment	—0—	345.05
Transfer to Code 26741	11,060.00	17,009.00
TOTAL	$ 22,461.58	$ 50,438.11
LXXXI. FINANCE AND PERSONNEL		
Salaries and Wages—Permanent	$ 15,113.00	$ 17,271.00
Salaries and Wages—Temporary	1,498.00	2,630.00
Supplies and Materials	1,759.07	1,274.71
Postage, Tel., Teleg., & Express	10,000.00	10,000.00
Printing and Binding	1,582.03	5,027.71
Operation of Equipment	442.80	—0—
General Expense	1,258.50	409.73
Equipment	—0—	737.58
Retirement	4,039.66	6,082.35
Social Security	2,734.06	3,585.33
TOTAL	$ 38,427.12	$ 47,018.41
LXXXII. MOTORBOAT LAW ENFORCEMENT		
Transfer to Code 26741	$ 190,434.00	$ 195,439.00
LXXXIII. EDUCATION DIVISION		
Salaries and Wages—Permanent	$ 16,556.00	$ 7,587.00
Supplies and Materials	918.12	41.62
Postage, Tel., Teleg., & Express	200.00	—0—
Travel Expense	23.53	25.34
Printing and Binding	11,864.16	—0—
General Expense	298.85	—0—
TOTAL	$ 29,860.66	$ 7,653.96
LXXXV. ENGINEERING		
Salaries and Wages—Permanent	$ 10,408.00	$ 25,157.00
Salaries and Wages—Temporary	9,996.50	15,893.00
Supplies and Materials	—0—	1,754.21
Postage, Tel., Teleg., & Express	—0—	473.39
Travel Expense	2,878.34	8,866.52
Operation of Equipment	—0—	8,877.12
Power and Lights	—0—	26.81
Repairs and Alterations	4,332.08	40,493.76
General Expense	—0—	20.16
Motor Vehicle Exchange	—0—	10,050.57
Equipment	—0—	6,265.50
TOTAL	$ 27,614.92	$ 117,878.04
REFUND OF RECEIPTS AND EXPENSES	585.50	2,416.59
TOTAL EXPENDITURES	$ 309,383.78	$ 420,844.11
RECEIPTS		
Registrations — Boat	$ 215,805.50	$ 233,702.50
Federal Cooperation	23,088.47	—0—
Gasoline Tax Refund Allocation	157,888.44	191,523.51
Funds Reverting from Capital Improvement Fund	—0—	22,649.62
Refund of Receipts and Expenses	585.50	2,416.59
TOTAL RECEIPTS	$ 397,367.91	$ 450,292.22
SUMMARY OF OPERATIONS		
Transferred from preceding year	$ 66,429.42	$ 154,413.55
Gross Receipts for year	397,367.91	450,292.22
Total Available Funds	$ 463,797.33	$ 604,705.77
Less Expenditures	309,383.78	420,844.11
*Operating Reserve June 30, 1969	$ 154,413.55	
*Operating Reserve June 30, 1970		$ 183,861.66

*This operating reserve is required for meeting payrolls and other obligations during the months of July, August and September each year when revenue from motorboat registrations is very low.

SUMMARY OF COMMISSION RECEIPTS FOR TEN YEAR PERIOD 1960-61 - 1969-70

The following table gives a picture of the growth in Wildlife Revenue during the past ten years.

Fiscal Year	Receipts
1960-61	$2,707,684.24
1961-62	2,977,927.24
1962-63	3,145,216.21
1963-64	3,213,184.84
1964-65	3,446,620.80
1965-66	3,823,857.59
1966-67	4,039,229.00
1967-68	4,325,366.00
1968-69	4,522,591.23
1969-70	5,778,336.50

HUNTING LICENSES AND PERMITS

	1968-69		1969-70	
	Number	Value	Number	Value
Resident Combination Hunting & Fishing Licenses	189,721	$1,138,326.00	175,441	$1,228,087.00
County Resident Licenses	125,438	188,157.00	97,654	219,721.50
State Resident Licenses	129,888	519,552.00	120,237	601,185.00
Nonresident Licenses	5,291	113,756.50	5,539	119,088.50
Nonresident 6-Day Licenses	2,070	36,225.00	2,372	40,917.00
State Resident Trapping Licenses	1,049	3,147.00	1,250	5,000.00
Hunting Guide's Licenses	212	1,060.00	242	1,149.50
County Resident Trapping Licenses	1,196	2,392.00	1,218	3,654.00
Controlled Shooting Preserve Licenses	213	1,065.00	269	1,614.00
Deer Still Hunting Permit	36,010	144,040.00	34,694	138,776.00
Raccoon and Opossum Permit	569	2,845.00	638	3,190.00
Resident Add-on Party Member Permit	181	452.50	263	657.50
Nonresident Add-on Party Member Permit	5	25.00	2	10.00
Wilderness Permit	539	6,468.00	540	6,480.00
Resident Party Leader Permit	39	2,925.00	46	3,450.00
Lake Mattamuskeet Waterfowl Permit	1,279	2,558.00	1,721	3,442.00
Bush Blind Licenses—Dare County	296	370.00	369	461.25
Waterfowl Blind Licenses—Currituck County	441	441.00	465	465.00
Shooting Point Licenses—Currituck County	234	2,106.00	243	2,187.00
Deer Still Hunt Permit—Either Sex	10,610	53,050.00		
Season Game Lands Permit	5,512	27,560.00	5,438	27,190.00
County Resident Fur Dealer's Licenses	26	130.00	25	125.00

	1968 - 1969		1969 - 1970	
	Number	Value	Number	Value
State Resident Fur Dealer's Licenses	40	$ 1,000.00	49	$ 1,225.00
Resident County Fur Dealer's Licenses	9	90.00	7	70.00
Nonresident Fur Dealer's Permits	2	2.00	4	4.00
Nonresident Fur Dealer's License	1	100.00		
Nonresident Landowner's Licenses	6	30.00	29	145.00
Nonresident Trapping Licenses	3	75.00	7	175.00
Special Big Game Hunting Licenses			131,077	196,615.50
TOTAL	510,880	$2,247,948.00	579,839	$2,605,084.75

Hunting Licenses are sold for fiscal year, and fishing licenses are sold for the calendar year. Since combination hunting and fishing licenses are on a fiscal year basis, the total income derived is included in the hunting license table.

The comparative figures shown above are for the license years and cannot be added together to obtain a total revenue figure for any fiscal year. The correct revenue figures for the fiscal years 1968-69 and 1969-70 are shown in the budget.

FISHING LICENSES AND PERMITS

	1968		1969	
	Number	Value	Number	Value
Resident State Daily Fishing Licenses	101,439	$ 76,079.25	99,905	$ 74,928.75
Resident County Fishing Licenses	33,050	49,575.00	31,431	47,146.50
Resident State Fishing Licenses	129,273	517,092.00	138,599	554,396.00
Nonresident State Daily Fishing Licenses	30,794	46,191.00	32,533	48,799.50
Nonresident State 5-Day Fishing Licenses	10,749	37,621.50	11,504	40,264.00
Nonresident State Fishing Licenses	6,304	50,432.00	7,022	56,176.00
Resident Special Trout Licenses	59,699	59,699.00	61,661	61,661.00
Nonresident Special Trout Licenses	3,165	9,495.00	3,342	10,026.00
Resident Special Rough Fishing Licenses	5,987	8,980.50	5,428	8,142.00
Resident Shad-Herring-Mullet Licenses	8,704	13,056.00	9,737	14,605.50
Management Area Special Daily Permit	14,231	21,346.50	15,184	22,776.00
Nonresident Special Rough Fishing Licenses	15	45.00	24	72.00
Nonresident Special Shad-Herring-Mullet Licenses	41	123.00	82	246.00
Game Fish Propagation Licenses	18	90.00		
Non-Game Fish Propagation Licenses	13	6.50		
Resident State Bow & Arrow Licenses	817	1,225.50	946	1,419.00
Nonresident Bow & Arrow Licenses	1	3.00	2	6.00
Management Area Season Permit	1,287	19,305.00	1,362	20,430.00
Eastern and Central Game Lands Permit	1,563	4,689.00	1,099	3,297.00
TOTAL	407,150	$915,054.75	419,861	$964,391.25

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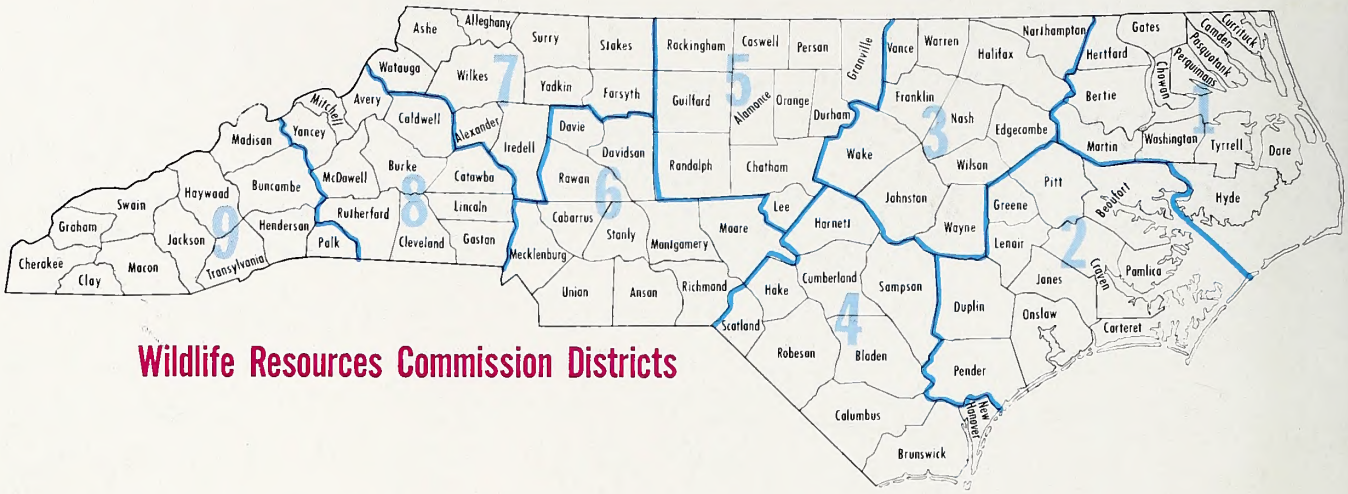

Wildlife Resources Commission Districts

GOVERNOR APPOINTS

LEGISLATURE ENACTS ENABLING LAWS

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NINE MEMBER POLICY MAKING BODY

ADMINISTRATION OF FIVE-POINT PROGRAM

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Wildlife IN NORTH CAROLINA

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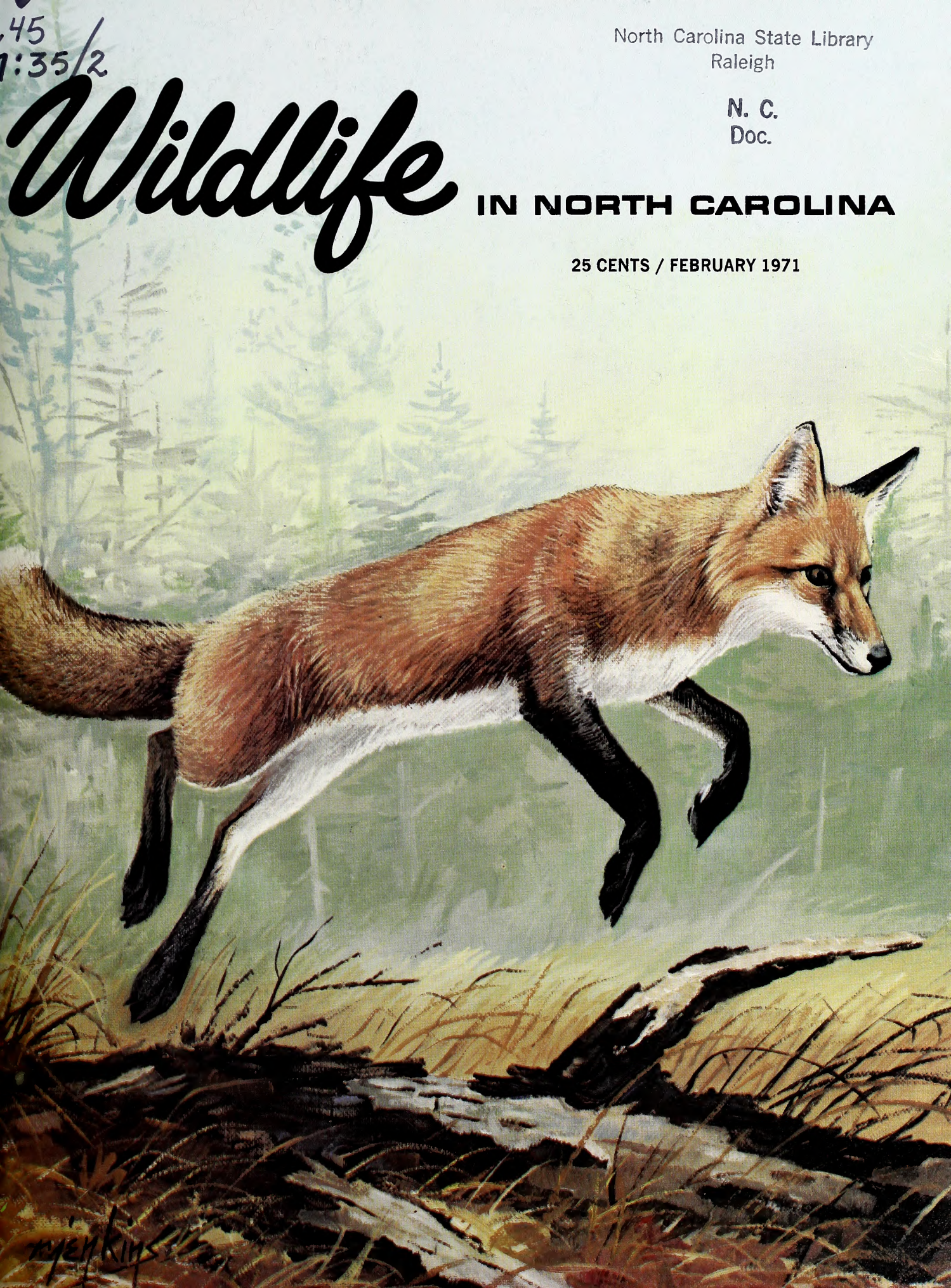

PHOTO BY KARL MASLOWSKI

WINTERTIME

Late winter presents wildlife with some additional problems of finding adequate food and water. This cottontail sips from a woodland brook after a meal of grasses. Spring is just around the corner . . . he hopes.

STATE OF NORTH CAROLINA

ROBERT W. SCOTT
GOVERNOR

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WILDLIFE RESOURCES COMMISSION

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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VOL. XXXV, NO. 2 FEBRUARY, 1971

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JIM DEAN _ _ _ _ _ WRITER-PHOTOGRAPHER
JOHN PARKER _ _ _ _ _ BOATING EDITOR

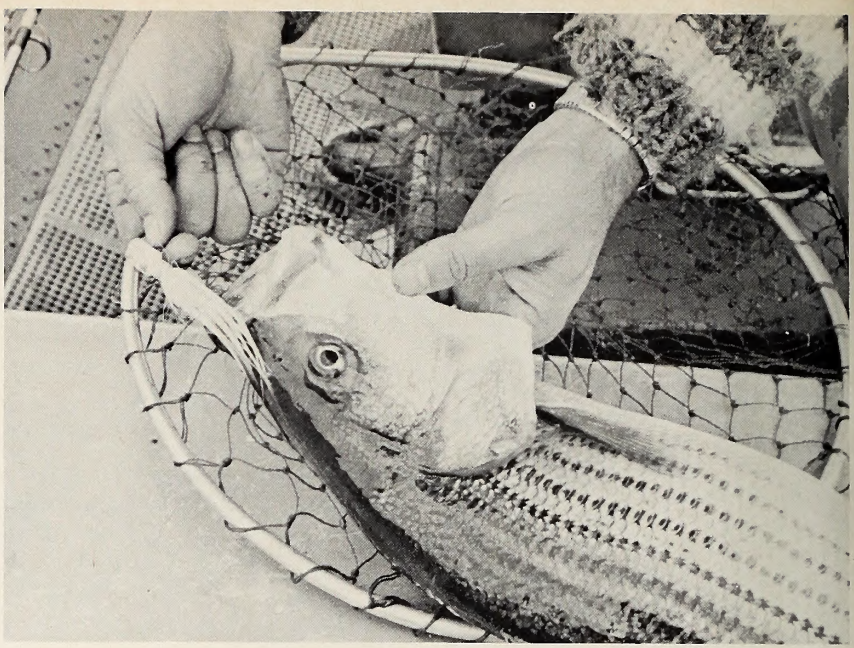
What is a red fox? The answer depends on the person being asked. He is a sought-after game animal, a quail-eating predator, an important cog in the wheel of Nature, a chicken thief, a dwindling member of the Tar Heel outdoor scene. Perhaps each answer is valid in various circumstances. The red fox is an important citizen of the wildlife world. Painting by Ron Jenkins.

Rockfish to the Rescue

By Jim Dean

PHOTOS BY THE AUTHOR

There used to be talk of outlawing the months of February and March, but old linesides has changed all that.



DUE to cosmic oversight, hunting will end in a few weeks with the fishing season still at least a month away. Being mere mortals, there is nothing we can do about this single flaw in an otherwise perfect universe.

That does not, of course, mean we have to like it, and for as long as I can remember, I have dreaded the arrival of that time we call February and March. It is a purgatory where man can neither graze in the clover of temporal sin nor sip from the celestial cup.

But I find I have been partly wrong about February and March.

A friend, Joel Arrington, disappeared for about a week one recent February, and I quite understandably assumed that he was off somewhere playing poker, trading dogs, writing a best-seller or all three.

When he returned and told me he had been fishing, I didn't believe him. When he showed me a string of big striped bass, I believed him. I can take a hint.

Joel told tales of big fish by the bunch. He had been fishing Croatan Sound under Umstead Bridge just east of Manns Harbor. When the fish stopped hitting, he jerked out his boat, drove several miles, and launched it in desolate East Lake. Using standard freshwater spinning tackle, he had played merry murder with stripers that ran from about three pounds to more than 20.

The upshot was that Joel acquired some excellent company for his next trip.

We fled Raleigh one Friday afternoon late last February heading east toward Stanford White's motel at Manns Harbor. We were trailing a 17-foot boat with an 85 horse outboard on the rear, and we had a 12-foot cartop boat on the roof. The luggage space was crammed with tackle, mostly freshwater spinning and casting tackle, although we also carried saltwater fly rods just in case.

That evening, two anglers in a skiff at the N. C. Wildlife Resources Commission's free boating access ramp on East Lake showed us a gorgeous string of stripers (most everyone calls them rockfish). Their biggest fish weighed nine and a half pounds. Over a period of four days, they had taken 97 rockfish, most in the four to five pound class. Best of all, they had taken the fish on light spinning tackle using shallow-running plugs.

The following morning, we launched our boat at the same ramp, strung the cartop boat behind, and headed up East Lake toward several likely spots including a place called "The Haulover." The Haulover is a narrow, shallow channel between the mainland and Durant's Island.

Our plan—after talking with the successful anglers—was to anchor the big boat and fish the stumpy banks from the cartop which was equipped with an electric motor. The big boat is capable of handling the rough water which often accompanies bad weather during the winter months, and the small boat is perfect for quietly fishing the coves.

Unfortunately, the fish stopped hitting, the weather turned bad and we were forced off the lake after less than a day's fishing.

The following day, we fished around the Umstead Bridge, having put in at a marina just off the west end of the bridge. We caught several stripers up to seven pounds, and lost one 20 pounds or better.

The fishing was good, but not really up to par, and even the charter boats which fish out of Manns Harbor were having only mediocre catches.

After fishing East Lake and the bridge in increasingly bad weather for several days, we gave it up and returned to Raleigh.

Although we didn't hit the fishing when it was at its best, we had some excellent sport. In addition to our stripers, Joel landed a four-pound

An excellent boating access ramp is maintained by the Wildlife Resources Commission on East Lake near Manns Harbor.

Joel Arrington nets a good striper under Umstead Bridge in Croatan Sound near Manns Harbor. Stanford White, Jr., is the lucky angler. Below, Ralph Keel (left) and Eugene Roberson of Robersonville display part of a catch from East Lake. They took 97 stripers in four days.

largemouth in East Lake, and I was surprised by a smaller bass which took my popping bug while I was wading the shoreline of East Lake with a fly rod, hoping to find a willing striper.

Despite only moderate success, we learned a few tricks about fishing these two striper hotspots.

We spent much of our time erroneously fishing close inshore on East Lake. Most of the fish are actually caught away from the bank, particularly off the points. A good technique is to start casting several hundred yards out from a point, and slowly move in until you hit the fish. East Lake fishing is also often good in and around the channel known as Haulover.

Because Eurasian water milfoil has spread to East Lake from Currituck Sound, trolling can be frustrating. Most of the fish are caught by casting while either anchored or drifting. Floating-diving plugs like the Rebel or Redfin are favored, although no doubt stripers will occasionally hit surface plunkers.

Under Umstead Bridge, various types of bucktail jigs are often the best medicine, particularly those which are white or yellow. We had our best results casting under the bridge around the supports and retrieving slowly. A powerful electric motor is a boon to this kind of fishing because the current flows rather swiftly under the bridge at times, and without the trolling motor, we would have had to anchor often. Successful anglers keep on the move up and down the side of the bridge until they find the fish, then they anchor and cast.

Many anglers, particularly the charter boat fishermen, troll along the side of the bridge, allowing the current to sweep their jigs near the bridge pilings. At times, this is highly effective.

We found that standard freshwater or light saltwater spinning tackle is ideal. A spinning stick about seven-feet long is a good choice. Anglers should use a full reel of at least eight-pound test monofilament, and 10- or 12-pound test might be better. A reel with a good drag is essential.

Casting tackle is also completely acceptable for those who prefer to use it, and my biggest fish was taken on a six-foot casting rod and a reel containing 100 yards of 20-pound test. That's enough for anything you're likely to hook.

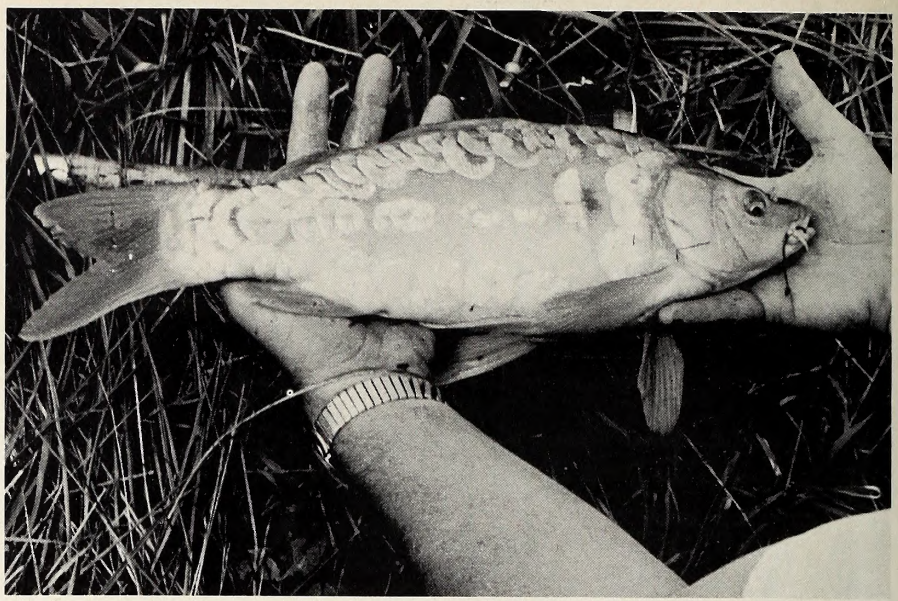
A word of caution concerning boats. Although it's certainly possible to fish East Lake and Croatan Sound from a small skiff, it isn't advisable. Weather, wind and water conditions change quickly, and a small runabout is not the safest transportation on these large bodies of water. If you don't have a fast, wide-beamed boat—14 feet long at least—it might be a good idea to use the charter fleet.

By the time you read this, Joel and I should be back at East Lake or Croatan Sound giving the stripers some grief.

Who knows, I may get to like purgatory. ▲▼

The Exotic One

By Frank Mooney
Rougemont, N. C.



PHOTOS BY FRANK MOONEY

This small Israeli carp represents the partially scaled kind. Some have practically no scales at all while others are fully scaled like many of their German carp cousins.

The Israeli carp isn't the answer to every "weedy pond" and may even have some disadvantages. You be the judge.

"BET there are mighty few people doing what we're doing this morning", Jerry said, lobbing the wad of red wigglers into deep water near the dam. We both thought that it was a rather unique fishing trip. Perched on the only breeding pond of Israeli carp in North Carolina (to my knowledge), with permission to catch these exotic fish. These fish had never seen a hook and line, so we hoped they were eager for their fishing lesson.

Fishing is not a recent hobby of mine, but I'll admit the excitement was high as I anticipated a strike. It wasn't long in coming. Hunting or fishing for any new animal or fish always sends a wave of excitement along my casting arm or trigger finger. I had read about the Israeli carp, but this was my first chance to trade blows with one. A friend told me about someone having a pond located in Caswell County that had this exotic fish planted there some years back. Jerry Saunders wanted to help with the photography when he heard me talking about the place, so one Saturday we crammed our gear into the car and took off.

After several wrong turns, and several inquiries we found Mr. W. C. King, the owner of the pond. The lake was beautiful, surrounded by lush green grass and cattle grazing nearby. Mr. King was kind enough to let us fish for these imports, and told us about his experience with them. Upon seeing the pond I noticed the lack of algae (also called scum, moss and weeds) that usually abounds in many ponds. The Israeli carp here were doing their thing.

These exotic fish are known for their gorging on the algae that apparently chokes the fishing in many ponds and lakes, and interfere with the spawning activity of the gamefish. Mr. King threw some bread on the surface of the water, and soon the water erupted with the feeding antics of the fish. Their appearance was much the same as the common carp, however, this fish feeds on top as well as the bottom, where the common carp is almost strictly a bottom feeder.

The Israeli carp feeds on floating algae and that which grows on the bottom. Due to the lack of algae Mr. King supplemented their feed with whole grain corn, wheat and oats. The oats were placed into the water still in the sack, until the swelling of the grain burst open the sacks, then the fish fed.

He told about the pond behind his house that was completely covered over with algae when the first fingerlings of Israeli carp were stocked. The pond was no use for fishing or irrigation. The algae was so thick that it would stop up the pipes in the irrigation system. They even tried using old tires and screen wire to keep the algae from clogging up the pipes, but even that failed. Some chemical company tried to kill the algae, but the chemicals failed also.

Then in 1962, Mr. King stocked the pond with 50 Israeli carp fingerlings about 5 to 6 inches long; two years later he planted 50 more. It took the fish three to four years to eat it back into a beautiful lake. Now the irrigation pumps can do their job, and the bass, bream and crappie population is thriving. According to Mr. King some large gamefish have been taken from these waters. One day while plugging for largemouth bass he hung into what he thought was a granddaddy of a bass. After a long hard struggle he landed an 8-pound Israeli carp.

He describes the fish as beautiful; some anglers say ugly, other say tough. The reaction is usually different; however to Jerry and me it's "thrilling". We caught about 40 fish, most were on the small size but gave a good account of their power. These fish have some of the sucking, mouthing characteristics of the common carp, but bite the worm much like the bluegill.

On the initial strike they often tighten, slack, tighten, slack the line much like the common carp; other times they move out like a bluegill or bass. They are not as cautious as the common carp, therefore are easier to hook. Of all the fish we caught, only one was completely covered with scales, the others were scaled like the mirror carp, a species of the German or common carp. Their coloration is beautiful; silver white shoulder and flank with greenish forehead and reddish fins. An occasional one has a golden glow along the side.

We decided to quit fishing, and check by Mr. King's house before going back home. "Lets try one more cast", Jerry said, spitting on the worms before casting near the shoreline. "Hey", he yelled out, "I got a big one", the rod was bending dangerously. "You're hung", I chided. Then the fish decided to move toward shore. The fish went almost aground before turning back to deep water, boring deep and fighting hard all the time. That fish churned up the corner of the pond, before we dragged it on land. Looking down at the gleaming fighter I had to admire its fighting ability. Jerry was out of breath from the fight and excitement, babbling about how pretty it was, and how hard it fought.

Then the largest fish of the day began feeding. The largest ones were caught near shore and around noon. The weather was hot, and we thought the larger fish would be in deep water. When first hooked the big fish would make a dash for the shore, whether to foul the line, break off or maybe it is just one of their traits—we were unable to determine. The fish were really suckers for red worms. In the rush I had forgotten my tackle box, so I couldn't cast artificial lures for them. According to most reports, the Israeli carp is not supposed to bite or strike plugs readily.

On one occasion after catching a fish that looked like the one I had just thrown back, Jerry said in a joking manner, "That's the same fish". While unhooking the fish I noticed a red place where a hook had just been removed. From then on we checked the fish for any signs of being hooked before, and found two more that had been released. "People won't believe this", Jerry said, looking as if he couldn't believe his own eyes. It was hard for me to believe, but those fish were hooked twice within a 30-minute span.

Perhaps you'll be interested in some of the background of this exotic carp, which I received from the Perry Minnow Farm, Windsor, Virginia. The Israeli strain, through a hundred years or more of breeding in Yugoslavia and Israeli, was developed into a fine food fish. Experienced men report that under normal pond conditions "ole rubber lips" will grow five pounds a year. This is fantastic growth for fish, while cleaning up the pond of the algae growth is really a bargain.

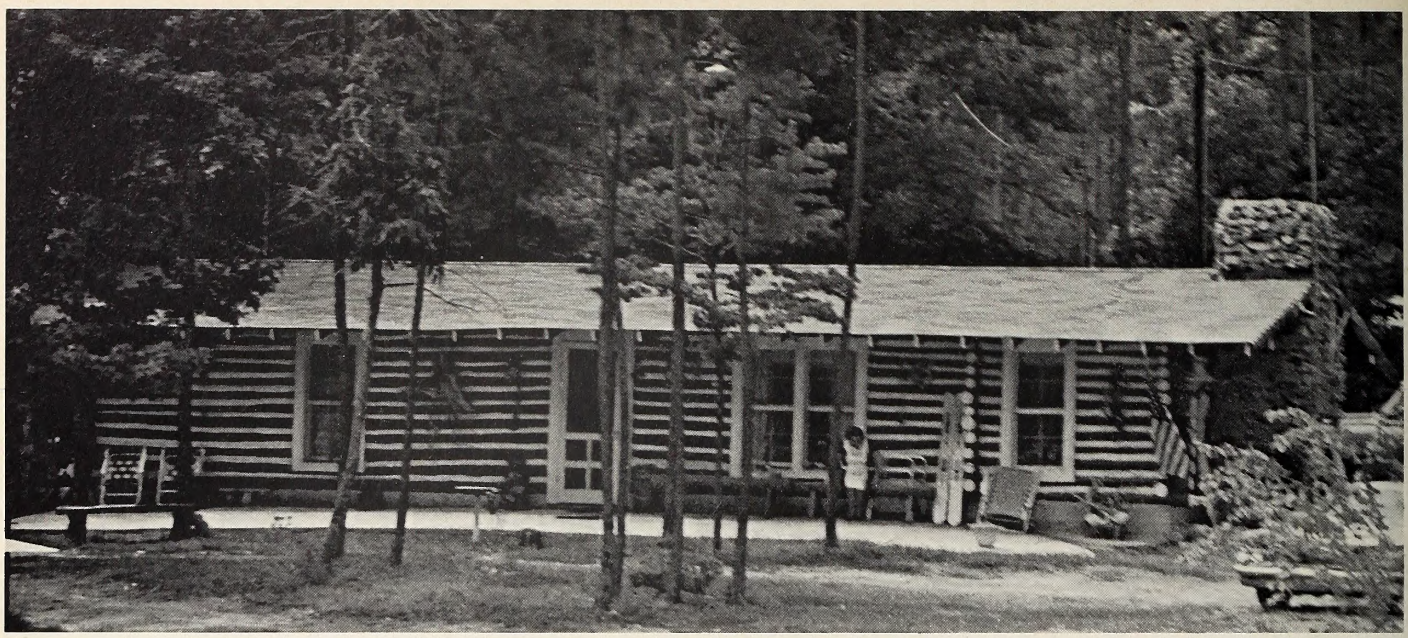
Research at Auburn (Alabama) University has shown that Israeli carp are often effective in controlling algae in reservoirs and farm ponds with little if any detrimental effect upon other fish. With this exotic fish there is seldom a problem of "taking over" the pond. Where bluegills are present or even waters that carp have been stocked for some time the Israeli carp will not reproduce due to a hormone-like repressive factor released in the water.

The Perry Minnow Farm in Windsor, Virginia has been supplying pond owners for the last four years. Their original brood stock was purchased from Auburn University. They say, "Our customers report satisfactory results with no adverse effects". The Tennessee Game & Fish Commission reports, "The Israeli carp is not considered a "cure all" in the control of filamentous algae or especially rooted aquatic weeds, but we have been pleasantly surprised by rare cases of spectacular control".

Mr. King said that the fish had eaten all the algae in the breeding pond and needed to be moved. Many were the correct size for restocking a pond If someone had a way to catch them, he would be willing to sell some for stocking purposes. That day Jerry and I with hook and line could have taken enough for stocking a pond. After having six ponds stocked with Israeli carp, some since 1962 Mr. King is sold on this exotic fish. In no ponds where other fish were present had he seen any small Israeli carp.

In the breeding pond that we fished, it took about four years after all gamefish were removed before any fish were successful at spawning. Under normal condiions, the Israeli carp is said to grow five pounds a year, is good on the table, and has good fighting abilities. I can vouch for the fighting ability, but since we returned all the fish to the pond, I have not eaten any.

There are always two sides to any fish tale, but Mr. King said that in no way could he see any ill effect the Israeli carp has had on the other fish populations in any of the six pounds. From the fishing standpoint I give the Israeli carp the nod; but for other people and other situations I cannot say; you be the judge. ⬍⬍



Timberlodge - Wildlife Retreat

by Ruth Mincher
Littleton
PHOTOS BY SARAH SHEFFIELD

ONCE upon a time there were three bears—a daddy bear, a mama bear and a baby bear—so the old nursery tale goes.

Well, these three bears (or three like them) have found a permanent home at "Timberlodge," the charming home of Mr. and Mrs. Stanton S. Viverette on Lake Gaston near Littleton.

The daddy bear is a huge bear-skin rug; the mama bear has her head mounted and on the wall; the baby black bear stands behind the door, holding an ash tray for the many guests who come and go.

Bears are not the only wildlife that the Viverettes have preserved and display in their cabin; among woodland creatures and birds are a fox squirrel, a wild boar, a mallard duck, a wild turkey, and a deer. There is even a hornets' nest hanging in the large living room of Timberlodge.

Mr. Viverette was born and grew up near Enfield where he maintains considerable farming interests. When this active gentleman decided to build his log cabin he bought a lot and then purchased "a few extra trees." With the help of a couple of farm hands he built this attractive home and named it, appropriately, Timberlodge. The logs were treated with a redwood preserver and put together with what Mr. and Mrs. Viverette term "old-fashioned dobbing." The result is beautiful.

Viverette really is a "handyman" with a talent for making attractive things, and some of his works are in his summer home. Among them is a "Lazy Susan" table with a dining area large enough for at least 12 people. A table at the window holds an attractive lamp made from a cypress knee that came from the swamp on one of his farms.

Above the dining table is a wagon-wheel chandelier—a wheel that came from a wagon his family used on the farm before he was born. "I was raised on that wagon," he chuckles. There are four lights made from large old-fashioned lanterns on the wagon wheel, and the whole chandelier is suspended from a heavy beam by chains.

In addition to the large living room-dining room-kitchen area, the house has two comfortable bedrooms and a complete bath.

A huge stone fireplace is one of the newest additions to the Viverette home. Of course, it helps out with the heating in the winter, but it also is fitted with old-fashioned cooking pots and utensils. Mr. Viverette says "I cook in those pots, too."

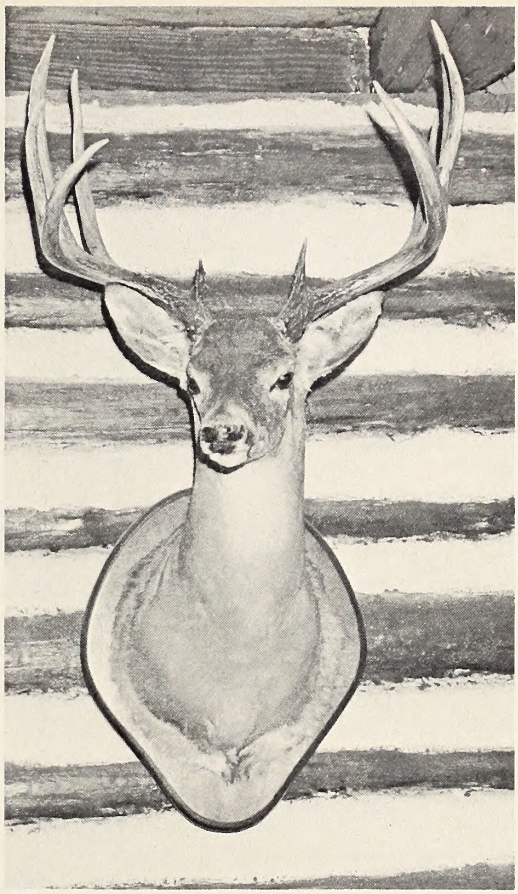
Timberlodge was completed in 1965. It is located right on the waterfront and Mr. Viverette has just recently replaced the entire fishing pier with a brand new one with a sundeck, no less, for their young lady guests who want to soak up the sun.

The plants growing in the yard, the"cook-out" fireplace, and rustic benches made from split logs all add to the attractiveness of the cottage.

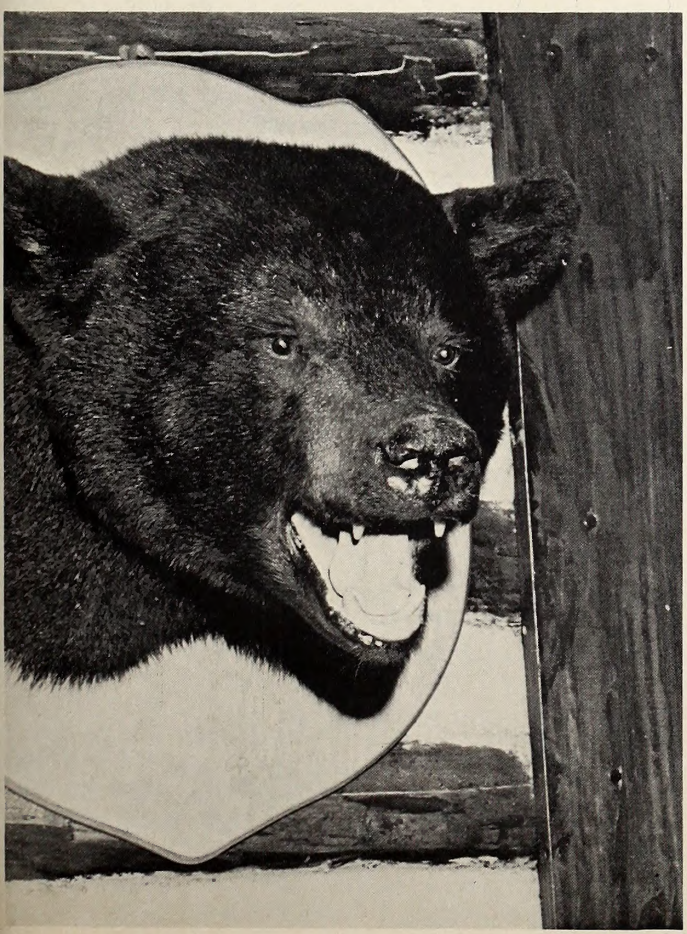
Beautiful Lake Gaston is 34 miles long with 20,300 acres of clear blue water and a shoreline 350 miles long. Its water quality is rated in the highest category of stream sanitation in America; its normal water fluctuation is said to be slight.

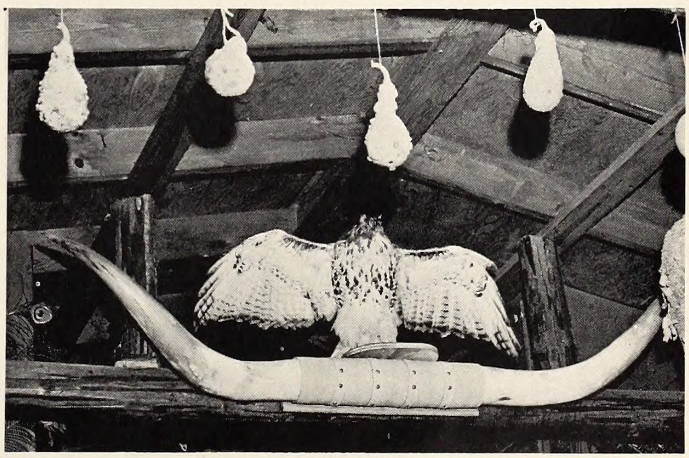
Mr. and Mrs. Viverette are always delighted to welcome guests to Timberlodge—"Anytime except Sunday mornings," he says, "when we will be at church." ⬍⬍

The massive fireplace is fitted with usable cast-iron cooking pots and pans. Its primary use, however, is to supplement the heating system in winter. This handsome 10-point buck (right) was killed on the family farm.



"Papa bear" surveys the scene from his spot on the rustic wall. He came from the Dismal Swamp many years ago. An impressive red-tailed hawk (right) perches on a set of Texas longhorns also from a bygone day. The cabin is filled with hunting trophies including this gobbler and red fox pelt.





Plotting the Seasons: Fall 1970 / Spring 1971

by John S. Radford, Sally M. Rogers and H. Lieth

IN the September 1970 issue of *Wildlife in North Carolina* we presented our first report on the North Carolina Phenology Program (Lieth, Radford and Courtney 1970). The phenological maps of dogwood and redbud flowering across the state created a great deal of curiosity among readers. We want to thank you for the many letters we received offering help and encouragement, and we look forward to your continued interest next spring. We wish to thank *Wildlife* for the fine job of printing the first maps. Our fall results are described in this article, along with some evaluations of our present observer network. We would appreciate your comments and suggestions.

The Objective of the Program

We are constantly being asked, "What is the purpose of this work?" The January 15, 1971 issue of *BioScience** offers a much more detailed answer than we can give here. Our main purpose is to contribute to resource management models. Most natural resources are utilized today on the basis of economic models, if indeed there are any models at all. The current environmental crisis can be largely attributed to this lack of comprehensive planning. We require a widespread incorporation of biological facts into decision-making policies. We hope to achieve this goal partially by uncovering important facts of particular ecosystems and putting them into geographical perspective.

Phenological events, which are functional parameters of the biosphere, respond very decisively to environmental forces. They are therefore of great value for theoretical model building, as well as for resource management concept development. Knowing the timing of these events at many locations enables us to extend our model application with accuracy and detail to large regions in the earth's biosphere.

Primarily for practical reasons we have started our project with common plant species. As we go along, we hope to incorporate other plant species, as well as birds, insects and mammals.

The Arrival of Fall 1970

The fall project aimed at the determination of dates of general leaf coloring. This marks the end of the growing season for most vegetation. We concentrated on two species: red maple (*Acer rubrum*) and yellow or tulip poplar (*Liriodendron tulipifera*). We thought that these two trees were widely distributed and easily recognizable. We ran into some problems with the observers, but received enough returns to produce another phenological map.

Map I shows the results of combining observer reports for red maple and yellow poplar colorings. Yellow poplar turned on the average about 1 week earlier than red maple. We have also produced individual species maps, but we include only the average of those two maps.

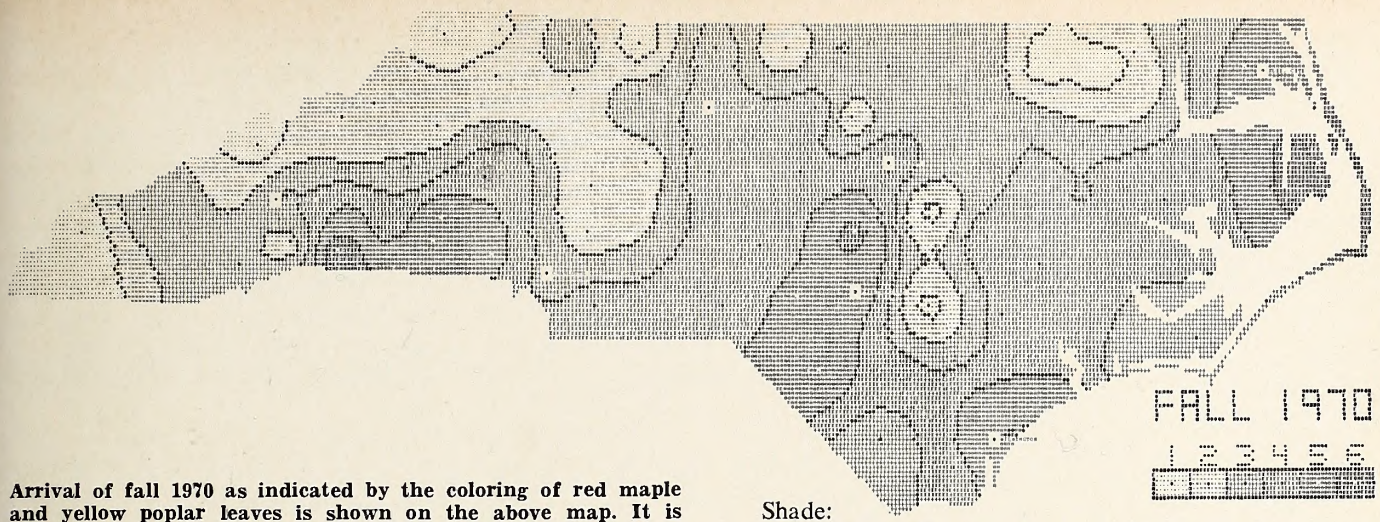
The map is presented in a new form. During the summer of 1970 we developed the use of a computer program that enables us to summarize your responses very rapidly. Once the data are put on cards, the computer calculates and prints a map in less than a minute. All the maps that we hope to develop with your help within the next five years will be expressed in this or similar form.

Evaluation of the Returns

As mentioned above, we ran into some problems with the phenophases we had chosen. Apparently the trees were not as widely known, and the phenophases not so easily recognized as we thought. We are grateful to those who took the time to tell us that they were unable to help. This is certainly preferable to receiving invalid information or no information at all, since it helps us modify our future efforts.

Table 1 shows the evaluation of the returns. One can easily see that the employees of the N. C. Wildlife Resources Commission, a newly-contacted group, were instrumental in saving the fall effort. We again had substantial efforts by certain individuals and groups. Among these are: Mr. Robert Ruiz, Swannanoa; Mr. W. B. Killingbeck, Hendersonville; Mrs. Jessie Sullins, Bakersville; Mrs. R. W. Conner, High Point; Mrs. Claire Goodwin, Leland; Mr. Zane Parnell, High Point; Mr. David Harris, Robbins; Mrs. Bethany Sinnott, Woodleaf; Mr. John A. Henderson, Kinston; Mr. J. R. Edwards, Waynesville; Mrs. Carolyn Renfro, Mt. Pleasant; the Vails, Kinston; Mr. Alex Duris, Hendersonville. Reporting observations as groups were the Mt. Pleasant High School class of Mrs. Nancy Bost and the Sandhills Community College (Southern Pines) Biology Survey class of Mr. T. Weaver. Involved in a closely related special project for recording temperature data were: Mr. Robert Ruiz, Swannanoa; Mr. W. B. Killingbeck, Hendersonville; Richard Harris, Suzanne West and Hal Howard, Wilkesboro Central High School; Mr. Charles Hutchinson, Brevard; and Mr. Dana Tugman, Laurel Springs (Transou Research Station).

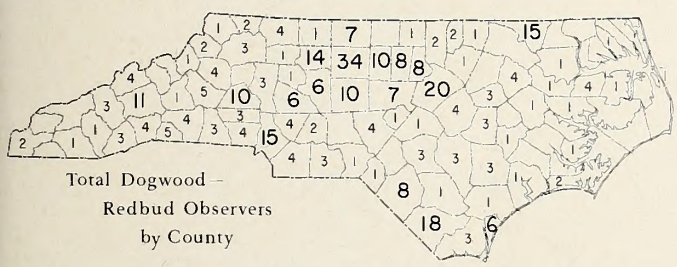
*Lieth, H. and Radford, J. S. Phenology, Resource Management and Synagraphic Computer Mapping. *BioScience*, Jan. 15, 1971.



Arrival of fall 1970 as indicated by the coloring of red maple and yellow poplar leaves is shown on the above map. It is based on data from sixty-two counties for which adequate information was available. Centers on these counties used as data points are indicated by solid points within lighter areas or blank points in the two darkest shades. Six major cities are indicated. The number of observers in each county for fall and spring of 1970 indicated below. More observers are needed.

Shade:

1	2	3	4	5	6
Calendar Days:					
Oct. 2-8	8-14	14-20	20-26	26-Nov. 1	1-7
Year Days: (after Jan. 1)					
275-281	281-287	287-293	293-299	299-305	305-311



Total Dogwood – Redbud Observers by County

Total Yellow Poplar – Red Maple Observers by County

Development Needs of the Network

So far we have had a good response of 200-300 returns per season, but we need 500-1,000. Even distribution over the state is as important as numbers. The spring 1970 return was heavily concentrated around the Piedmont "megalopolis". (Such strong clusters have proven very valuable for modeling purposes, and will hopefully continue next spring). Unfortunately, some counties sent no returns at all, which makes the placing of delineations vague in those areas.

Maps 2 and 3 illustrate the development of the observer network. The lack of observers in certain mountain and coastal plain areas is particularly noticeable. If you happen to live in counties where none or very few returns are reported, please contact us so that we can provide you with the necessary material and include you on our mailing list. You may address your requests to:

Mrs. Sally M. Rogers
Phenology Program
Department of Botany
University of North Carolina
Chapel Hill, N. C. 27514

Mrs. Rogers will be responsible for the spring 1971 mailing.

The Spring 1971 Program

We plan to use redbud and dogwood flowering dates again this year as representative of the arrival of spring 1971. In February we will send the necessary forms to you. They will again include an explanation of what specific phenomena to look for.

In addition, we would like to know when the red maple flowers in your area. It generally starts to flower before the dogwood and redbud. You should be able to identify the red maple at that time more easily than later in the year. If you have located one, please mark the tree, as we will need its leaf coloring date next fall. We would also like you to mark the tree from which you report dogwood flowering, and indicate which side your observation is taken from. We would like to use the same tree for the fall inquiry.

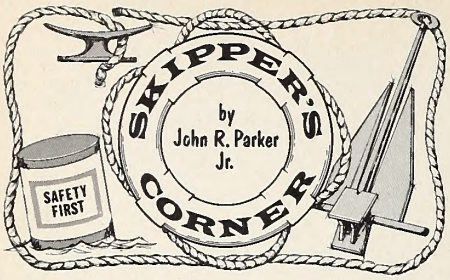
We will be looking forward to hearing from our previous respondents, and to welcoming new volunteers. We will be especially grateful for cooperation from the counties not yet covered.

Table 1. Cooperation in the N. C. Phenology Program: Fall 1970

Groups	No. Persons Contacted	Responses Received*	% Response
1970 spring observers (individuals, garden clubs, conservationists, school groups, etc.)	276(1571)**	76(293)	27% (19%)
Wildlife Managers	270	52	19
Volunteers in response to September **Wildlife in N. C.** article	67	40	60
Special groups (school classes, scout troops)		40	
Miscellaneous		2	
TOTALS	654	210	32%

*This includes only the number of respondents. Many persons sent more than one response form. Deadline 30 Dec. 1970.

**Figures in parentheses are for spring 1970.



TILTING or "trimming" the modern outboard motor is not the job it use to be. Closer to the truth, it does not have to be the back straining job of yesteryear. Of course, almost anyone with the strength to make a cast or toss out a decoy can tilt one of the small "fishing" motors. But lifting the heavies over a stump or shoal or into a lock position is another story, another load. Trimming the motor angle while running is also another important aspect.

Power tilt and/or trim is offered as an option by the major outboard manufacturers (It is usually standard on inboard/outdrive units). In use since about the mid 60's, these units have been improved and are now frequently requested and highly practical options. The units range in price from approximately $175 to $260 depending on brand, motor size, and whether or not trim as well as tilt is available. The mid-range motors, from 40-50 horsepower, are normally the starting size for power-tilt installation. The package usually consists of a dash-mounted control button(s) or switch, electrical hook up, hydraulic pump and lifting piston.

Power tilt only units can be used for slow speed and shoal water operation; full tilt for launching and loading. Trailering with the motor resting on the tilt piston is not generally recommended unless an accessory tilt lock support is used.

The tilt-trim unit is used in the same manner as the tilt, plus offers the fine advantage of trimming the boat at any speed. A safety switch is employed to prevent high speed use in extreme tilt angles. Trimming a boat, such as doing so manually with the tilt pin, can increase performance and speed. And power trim, while running, is a typical and practical, convenience of boating in the seventies.

The power tilt on my personal rig has no doubt saved me from many a strained muscle come launching, loading and trailering time. The same is true for raising the motor to unwind a snarled trolling line, decoy line, etc. And if you are an adventurer, there will be many a time when the bottom is closer to the keel than it need be.

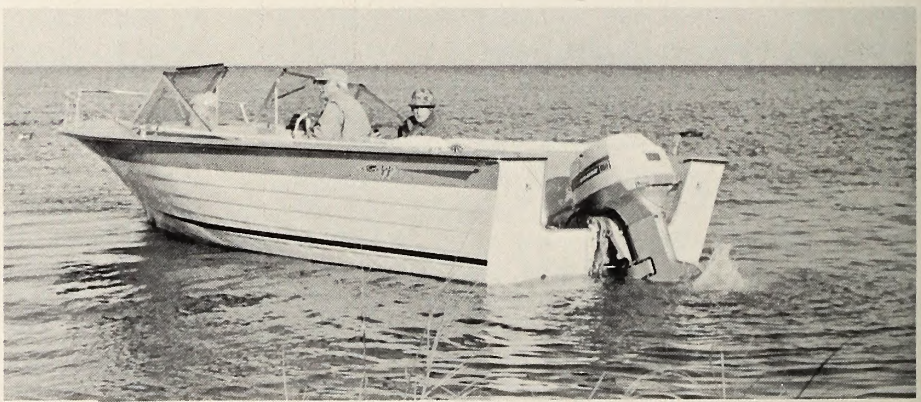
I use one of three basic warnings to prevent grounding while operating in the shallows (at slow speed of course). Visual contact, depth finder reading or sand/mud discoloration in the propeller swirl. The latter will actually occur prior to the prop or skeg striking bottom. At the slightest sign of danger, I touch the toggle switch and raise the engine. The amount depending on the situation of course. Also, I retard throttle to meet the situation.

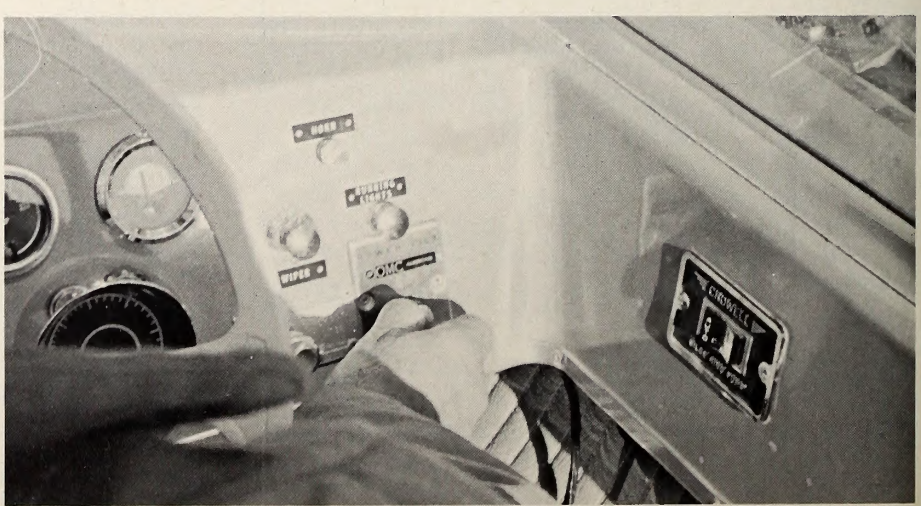
Is there a safety feature other than preventing strained muscles involved in using a power unit? Well, in many cases, you can stay out of trouble or get out of trouble without leaving the helmsman's seat. And remember, falls overboard are still a leading cause of boating fatalities.

Should you have power tilt or trim on your boat? Try it once and I believe you will be sold. I was.

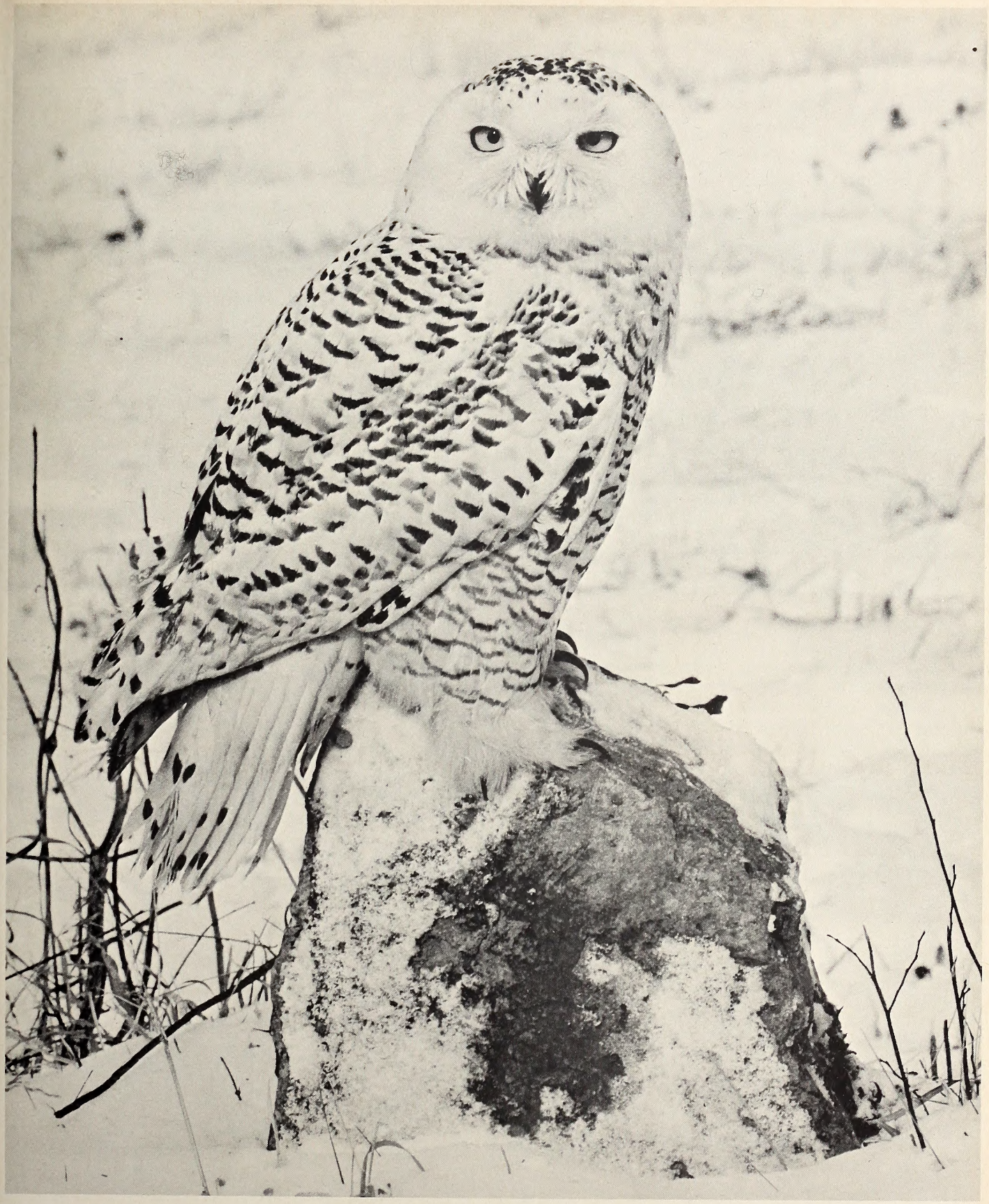
Boating Courses Offered

The following courses in boating safety will be offered by the U. S. Coast Guard Auxiliary: Winston-Salem, Main Public Library, 8 lessons start 3 February at 7 PM; Greensboro, Public Library, 8 lessons start 4 February 7 PM; Graham, Community Center, 8 lessons start 4 February at 7 PM. ⬍⬍





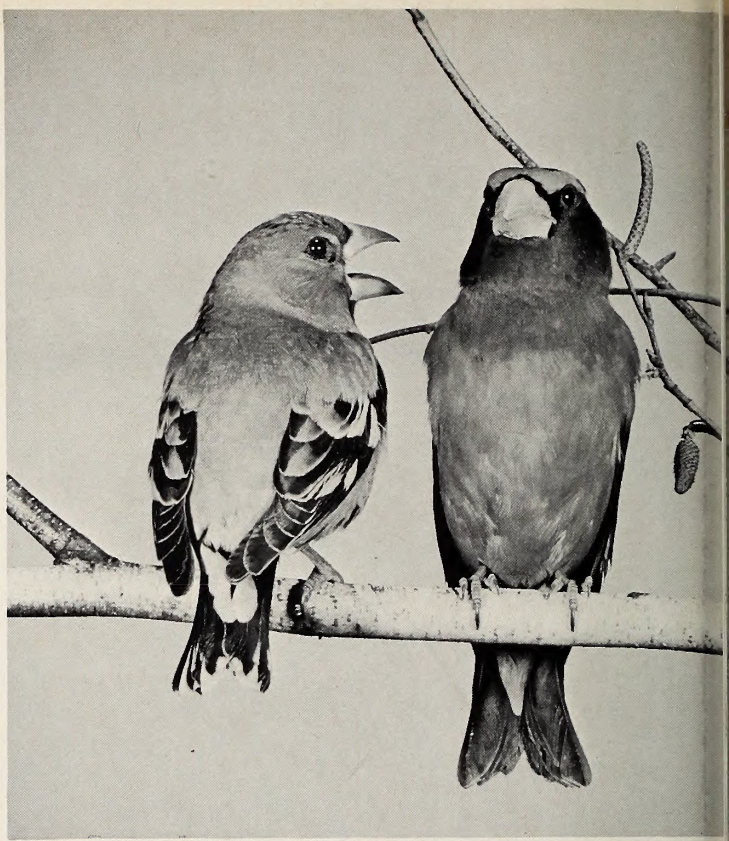
Here, my 19-footer is maneuvered in wind-swept shallows for decoy pickup by my father as my son stands by to bring them aboard. Below, a flip of the switch readies motor for shallow running.



WINTER VISITORS

Photo Feature By Karl Maslowski

Classified as an "irregular winter visitor" to North Carolina, the snowy owl does drift this far south when severe weather restricts its feeding activities to the north. This large, beautiful owl should never be shot or molested.



Although the red crossbill may be a resident of some of the higher mountains of our state, it is an infrequent visitor elsewhere in North Carolina. The evening grosbeak (right) is a much more numerous migrant and is no longer a rarity. The glaucous gull (below) seldom journeys farther south than New York, but several are recorded for North Carolina.

WINTER VISITORS

The prominent ear tufts give the long-eared owl its name. It is a very rare winter visitor to our state with each report carefully noted over the last 80 years. It may be mistaken for a small great horned owl which it resembles.

The purple finch is more of a winter resident than a migrant since large numbers spend the winter with us. The raspberry red of the male is best seen in the bright sunlight of a winter day. They come regularly to feeders and enjoy seeds. The pine siskin (right) may show up in considerable numbers or be almost totally absent in winter.

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Wildlife on Television

The following television stations have confirmed schedules for winter showing of the Commission's television program entitled "Wildlife in North Carolina." The half-hour color show will be aired as follows: WITN-TV, Channel 7, Washington, Sundays, 11:30 a.m.; WECT-TV, Wilmington, Channel 6, Saturdays, 1:30 p.m.; WTVD-TV, Durham, Channel 11, Sundays at 11:30 a.m. and WCCB-TV, Charlotte, Channel 18, Sundays, 12:30 p.m. Several commercial stations and the WUNC-TV Educational Network aired the 13-week series last fall.

Wildlife on Radio

For the past several years 20 radio stations across the state have been airing a weekly "chit-chat" type radio program produced by the Commission as a public service feature. Some stations have had the program sponsored locally.

Station managers wishing to air the lively, timely show (about 7 minutes) may do so by contacting "Wildlife on the Air", Box 2919, Raleigh 27602 for audition tapes. The only cost to stations is 6c per week for return postage.

February Sees End of Hunting Seasons

Except for a brief spring gobbler season, Tarheel hunting seasons end February 27. Except for black bear and wild turkeys, the general 1970-1971 hunting season was from fair to excellent, with a noticeable increase in ducks, good quail and rabbit hunting, and excellent squirrel hunting.

Boat Registration Up

A record number of boats were registered in North Carolina during calendar 1970, with a total of 76,239. This is nearly 6,000 more than were registered in 1969. In 1960 when the Boating Safety Act first required the registration of boats powered by machinery of more than ten horsepower, only 37,542 boats were registered. The 1970 figure is more than double that of 1960. There was no parallel increase in the boating accident rate.

Is Your Fishing License Valid?

If you have been fishing with a county or state fishing license, it expired at midnight, December 30. Combination licenses are good until July 31, 1971.

It's the Landowner's Choice

By
A. Sidney Baynes
Wildlife Biologist
N. C. Wildlife Resources Commission
and
Don Robbins
Service Forester
N. C. Department of Conservation and Development
Photos by A. Sidney Baynes

FOR many years reforestation and good wildlife management practices have complemented one another with major emphasis on management of the forest for timber production. Now with greater demands by the public on our forests for other benefits such as wildlife, recreation and water quality, it becomes necessary to place greater emphasis on these in the initial planning stages when considering all of the natural resources in making farm and woodlot recommendations.

In the summer of 1970, several joint meetings were held involving employees of the North Carolina Forest Service and the North Carolina Wildlife Resources Commission. These meetings focused on reforestation and wildlife habitat improvement and the various steps that could and should be taken to make our state's wildlife future a little brighter. The purpose of this article is to help show what evolved from these meetings and what can be done with a little forethought and consideration.

In September, 1968, Mr. Johnny Evans and his sister Mrs. Vance Fowler contacted the North Carolina Forest Service for forestry recommendations pertaining to a tract of woodland in the Cape Fear region of Cumberland County. After examination of the property, plans were initiated to reforest 311 of the total 440 acres in the tract. From the timber production standpoint this was a very sound recommendation since the area's timber resources already had been exploited by "high-grading" (removal of only the best trees and leaving the poorer, stunted ones).

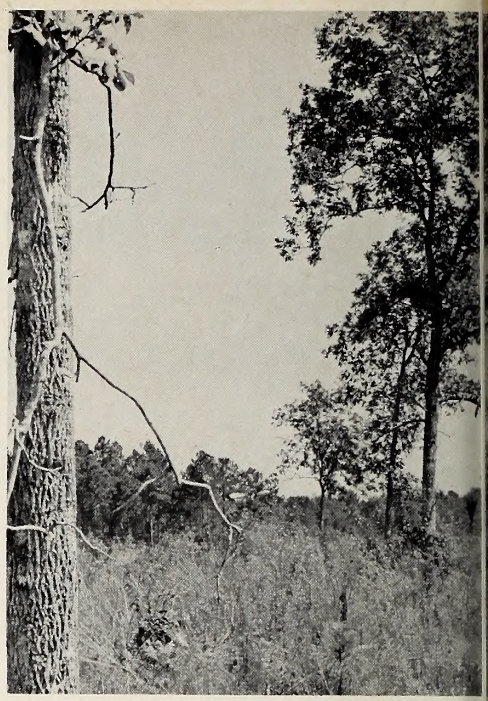
Site preparation was begun by first removing the remaining merchantable timber. Disking, drum-chopping, and burning would soon prepare the land for the planting of young pine seedlings. Only one question remained. What could be done to insure suitable wildlife habitat on this tract of land?

In October, 1970, several employees of the North Carolina Forest Service and the North Carolina Wildlife Resources Commission toured the area to evaluate the work that had been done and to determine what could be done to make the tract more desirable for wildlife. Prior planning on the part

Several finger-like projections of moist bottomland were left uncleared as shown in center background.

of the Forest Service had resulted in some wildlife habitat improvements in certain areas. Several finger-like projections of moist bottom land were left uncleared because the ground was too wet to support the heavy bulldozers and drum choppers when the surrounding areas were site-prepared. These fingers intermixed with the areas that were chopped and burned and were beneficial from a wildlife and esthetic standpoint because they would interrupt the monotony of the future plantations and provide food and cover for game.

Other areas had been left uncleared where high preparation costs presented only marginal long-term timber profits. An old home site with a dense plum thicket and large oak and hickory trees offered an island refuge for wildlife. A few mast-producing hickory and oak trees remained standing throughout the prepared areas. These trees would provide needed food for the wildlife of the area. The 89 acres of woodlands that were left uncut would offer tremendous amounts of food and protective cover. Several open fields were left unforested. Future corn and soybean crops would



An old home site (upper left) with its dense plum thicket and large oak and hickory trees offered an island refuge for wildlife. A few mast-producing hickory and oak trees (above) remained standing in the prepared areas.

Several fields were left unforested without noticeably curtailing timber production. Yet these fields provided small game with nesting sites and summer foraging areas.

enhance wildlife usage.

At the time of the visit, Wildlife Resources Commission personnel made various recommendations that would further improve the remaining habitat. Wildlife food and cover plantings were suggested. These plantings will be made along woods roads, in areas where pine seedlings do not survive, around the uncut woodland fingers, and interspersed throughout the pine plantations. Plantings will consist of several types of perennial lespedezas and an annual seed mixture. They will be provided by the Wildlife Resources Commission as a part of its upland game restoration program. Such supplemental plantings are essential when an area is modified so drastically.

Additional recommendations included the leaving of small wooded strips along streams and drainage ditches. These areas would act to buffer potential erosion problems as well as provide wildlife food and cover. The leaving of more large oak and hickory trees in other areas to be reforested also were suggested. This also will help to reduce the cost of site preparation. It will not greatly affect the new pine plantations as it is not necessary to destroy all standing trees in order to prepare an area for tree planting.

While wildlifers generally prefer to hold even-aged pine stands to 200 acres or less, this project demonstrates that good wildlife habitat can be maintained on larger blocks by retaining odd areas and "islands" of vegetative types other than pine.

It is also encouraging to note that more people appear to be realizing that provision can be made

The cleared strip along this woods road offers an ideal site for a wildlife food planting, without interfering with other land uses. Many farms could establish such plantings.

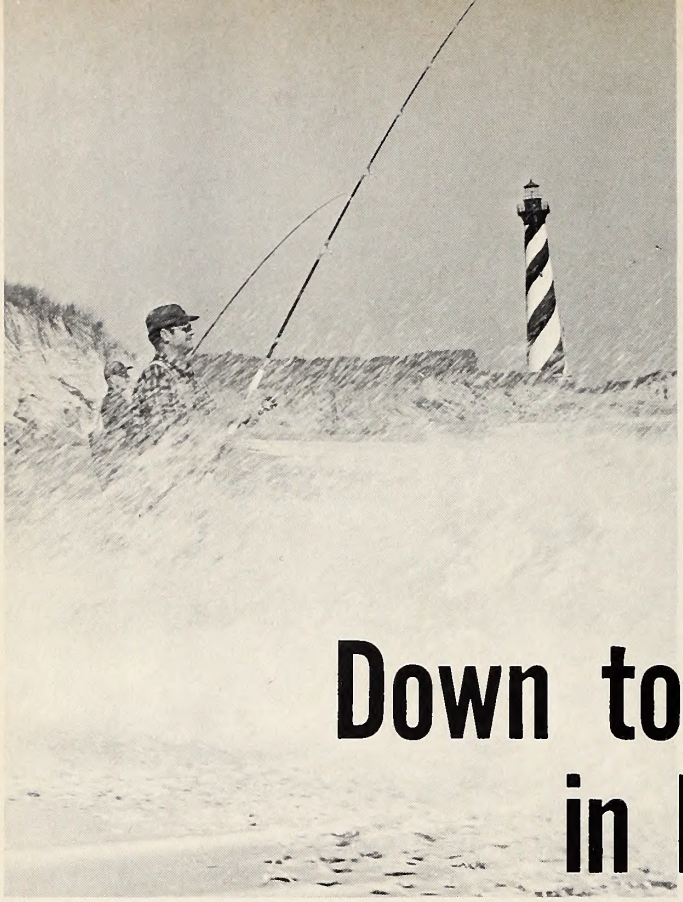
Heavy equipment is often needed to prepare the site for planting the next crop of timber. Native vegetation that produces food and cover for wildlife during early stages of the plantation seeds into the area naturally.

This scene of a site-prepared tract of land may be compared to freshly cleared agriculture crop land. A new forest will be the future crop here instead of corn or tobacco. With proper management, a bonus crop could be wildlife.

for retention of wildlife at relatively little cost and that this effort pays handsome dividends in increased value of the land. By providing for wildlife production the land will continue to provide recreational hunting opportunity which will become increasingly more valuable and marketable in the years ahead.

The overall future picture of this 440 acre tract of land is now one of a diverse mixture of community types instead of just one large pine plantation. Profitable plantations of pine will occur as well as areas suitable for wildlife use.

Prior planning has offered an alternative to the old concept that every pine plantation is a virtual ecological desert. This alternative has come about through mutual understanding and preparation between the North Carolina Forest Service and the North Carolina Wildlife Resources Commission. It is essential that total recommendations be presented to the landowner from all aspects of our natural resources and that projects be planned with multiple use in mind. However, prior planning and mutual considerations are to no avail if the landowner, the man that makes the final decision, does not fully understand and desire the best possible multiple use program for his property. It all boils down to the fact that—IT'S THE LANDOWNER'S CHOICE. ⬘



Down to the Sea in Boots

by Jim Tyler

Division of Commercial and Sports Fisheries
Department of Conservation and Development

"YE who go down to the sea in boots are welcome," the sign reads inside the entranceway of Cape Hatteras Anglers Club at Buxton.

Some 260 boot-wearing surf buffs traveled to Hatteras from as far away as New Jersey, November 5-7, in answer to the Hatteras Angler's invite and participated in their 13th annual surf fishing tournament.

The contest, billed as the largest surf fishing contest on the Atlantic coast, featured team and individual competition.

Forty-seven clubs entered the two-day team tournament. Each could have six fishers in action, however, some clubs fielded fewer. Twenty-five miles of beach, with Cape Hatteras about midpoint, were marked off in about one-quarter mile sections. Team captains drew station numbers from the lottery cardboard box the night before the contest. Each team fished one station for three hours, then switched to another station for the second fishing period of each day. That made four different fishing areas for each team during the two-day contest. Of course some stations proved more productive than others, and the initial draw of stations had a lot to do with the eventual winning team.

Scoring went like this:

—croaker, kingfish, black drum, pigfish, spot, pompano

1 point for a 10 incher, 2 points for an 11 incher, and so on.

—speckled and gray trout, bluefish, mackerel, flounder

3 points for a 12 incher, 4 points for a 13 incher, and so on.

—channel bass, striped bass, tarpon, cobia, false albacore, bonito

at least 14 inches and less than 2 lbs.—5 points, 2 to 3 pounds—10 points, 3 to 4 pounds — 15 points, 4 to 5 pounds — 20 points. For each additional full pound over 5 pounds, add 2 points.

Gale winds made fishing impossible to fairly poor and only 795 fish were caught.

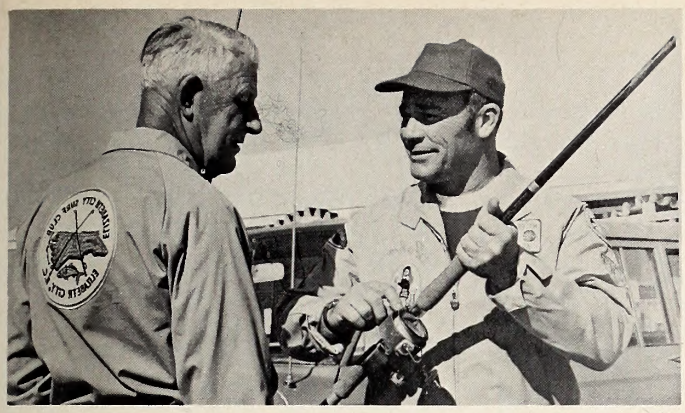
There was a tie for whopper of the team contest. Virginia Smith of Avalon Anglers Club, Kill Devil Hills, and Else Rathner of She Devils Anglers Club, Elizabeth City, each caught a 4 lb., 19 in. black drum.

Mrs. Ormond Fuller, of Hatteras Gulls, caught the most fish, 17.

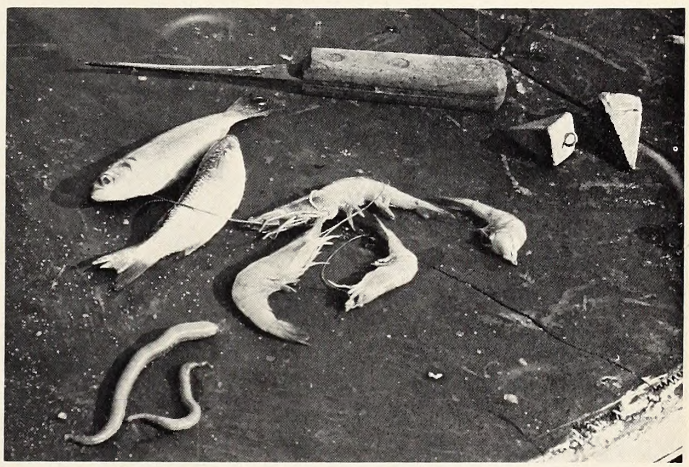
The Nags Head Fishing Club won the tournament with 186 points. Wading River Rod and Gun Club, Maple Shade, New Jersey, was second with 182 points. The Hatteras Gulls, a women's team, scored 178, and took third. Five women teams entered. They came on strong, hooking 3 of the top 12 places. Some teams were a combination of men and women anglers. A lady caught the biggest fish, another caught the most.

After the two-day team competition, individual competitors were given a day to roam the area and see which came back king, or we must say here, queen fisher. Entrants in this tournament were not confined to certain areas. Everyone on their own. It was one of those calm, warm, drowsy autumn days with the water clearing up after storm, and fishing was better. When the day was through and the scores tallied, three of the seven winners were women.

Makes you wonder who really wears the boots in a fishing family. ⬍



Every club has team jackets; these aren't for fishing, but for socializing in the evening. John Copley (left), team captain of the Elizabeth City Surf Club talks reels with team member Jim Ball. Right, the Sea Hags, a Nags Head based women's team work the beach.



This black drum, (left) added two points to the Elizabeth City Surf Club's total. Many natural and artificial baits were used, but because of the dirty water, team competitors used mainly bottom rigs baited with shrimp, cut baits and bloodworms.

Although the list of different species landed was not long, quite a variety came ashore. Here, a New Jersey lady angler beaches a nice flounder for her team.

WILDLIFE: THE ENVIRONMENTAL BAROMETER

Presented here is one of the best discussions of its kind in print. It is available in leaflet form at cost from the Wildlife Management Institute, Wire Building, Washington, D. C. 20005. Take time to read it.

FISH and wildlife are highly sensitive to environmental change. Alter stream temperature or flow, drain wetlands, channel natural water-courses, clear forests or make other changes that limit their food, water, or shelter and fish and wildlife are immediately affected.

Habitat governs wild populations

The composition and condition of fish and wildlife populations serve as a barometer of the quality of the environment for man, because he too must have clean water, fertile fields, and healthy forests. Consequently, proper use of our nation's land and water resources is in the interest of man and of the fish and wildlife he enjoys.

Nearly every wild fish, bird or mammal has a comparatively narrow range of environmental elements that determines its survival. These may be divided broadly into food, water, and cover. But, every species' need for each of these essentials differs to some degree from those of others.

Some desert animals, like the kangaroo rat, require little or no obvious water supplies; they have become adapted through evolution to obtain their moisture requirements directly from plants. At the other extreme, waterfowl and aquatic mammals, like the muskrat and beaver, need an abundance of water—not only for drinking but as part of their cover requirements and to promote the growth of their essential foods. Some species, like the pronghorn antelope, must have open grassland; others, like the deer, thrive in mixtures of brushland and young forest.

Climate, topography, and geology in a given area are basic influences on the composition of the plant community, and the nature and abundance of the local plants, in turn, govern the kinds of wild animals that the area can support.

Man-made changes in the environment need not be destructive of wildlife in general, although they may alter radically the composition of the wildlife population. Felling an isolated woodlot and replacing it with corn, for example, will eliminate gray squirrels but may improve conditions for pheasants. Flooding the entire cornfield would drive out pheasants but create useful habitat for ducks and muskrats. Altering or maintaining the environment to favor the needs of certain wild species, in fact, is a basic technique of wildlife management.

Man—a major environmental factor

Some environmental changes, however, may be extremely damaging to all wildlife. Excessive pollution, repeated uncontrolled forest fires, and farming and forestry practices that destroy soil fertility and the diversity of the plant community can create wildlife deserts.

When the balance between wildlife and its habitat is recognized, it is possible to understand why some species that never were hunted extensively became extinct while others that have been hunted intensively are among our most abundant species. The white-tailed deer, for example, is many times more abundant today than it was in 1900, and in most places more numerous than in 1600. Few of the birds and mammals listed as rare and endangered by the U.S. Bureau of Sport Fisheries and Wildlife ever were hunted. Most are victims of pollution, landfilling and clearing and other massive man-made environmental changes that have destroyed one or more essential elements in their habitat.

The transformation of America from wilderness to an urban-dominated landscape has brought great changes in the composition of the native wildlife. Species like the woodland caribou and ivory-billed woodpecker, which require habitats supplied only by the wilderness, inevitably declined. But their places usually were taken by other species better adapted to an environment shaped by man, but, like the starling, not always as well liked by man.

When desirable wildlife begins to disappear from a given area, in spite of legal protection, it is an indication that something is wrong with the environment. And the effects on human beings may extend far beyond the loss of esthetic and recreational values.

The basic needs of wildlife are essentially the same as those of man. Most species of wildlife are products of a clean, fertile, and productive environment. They must have adequate food, clean water and protection from the elements if they are to survive. So must man.

Wildlife needs variety in its habitat in order to exist. So, too, does man, but perhaps on a larger scale.

Even the most urban-oriented citizen, who rarely ventures from the asphalt and concrete of modern Metropolis, needs a constant supply of uncontaminated water, meat from ranches and rangelands, produce from farms, fish from seas and estuaries, and paper pulp from forests. Although he may not think of them in such terms, these far-flung natural and cultivated areas are essential parts of the habitat of modern man.

The lands and waters that produce these commodities also har-

bor the bulk of our wildlife, and their capacity to support fish, birds and mammals is a good indicator of their capacity for meeting the basic needs of man.

Wild lands have human values

Most modern Americans are only beginning to recognize their close bonds with the natural world. A sign of this is found in changing attitudes toward swamps marshes, and tidal estuaries. Until recently, these wetlands, cherished only by sportsmen and naturalists, generally were considered worthless until drained or filled. Unfortunately too many people still consider that their highest economic use is to serve as dumping grounds for the solid and liquid wastes of cities and industries.

The effects of this negative attitude have been apparent to sportsman and wildlife scientists for many years. Marshes that once teemed with songbirds, shorebirds, waterfowl and a variety of mammals, their waters clouded by noxious bacteria and algae, now support little but starlings and rats. Many wetlands have disappeared completely under the avalanche of human expansion.

So what?

Are not housing and factory sites, airports and highways, and even convenient dumps more valuable *to people* than a few ducks, herons, muskrats, and songbirds? Perhaps to a few, but today's outcries of concern make clear that people are seeking effective ways to halt the accelerating destruction of their environment.

Unspoiled tidal marshes rank in economic productivity above the best prairie croplands. Marsh-rimmed estuaries are vital to the more important commercial marine fishes and to crabs, shrimps, and shellfish. Continued destruction of tidal wetlands threatens a major source of human food and the livelihoods of many people. A study of tidal bays and estuaries in Massachusetts revealed the presence of 84 species of fish at some stage in their life cycles.

Inland ponds, potholes, and marshes—vital breeding grounds for waterfowl and natural refuges for many other forms of wildlife—also have important economic values. In many places they are essential functioning units of the natural recharging of underground water supplies —vital to local agriculture, industry and human existence.

Oil spills and their immediate effects on wildlife have stirred great public indignation in the past few years. But run-away oil slicks are only the more obvious signs of a far greater problem.

Much of the pollution that originates on the land finds its way to the seas—pesticides carried by the air or washed into rivers, chemical wastes from factories, detergents from laundries and kitchen sinks, untreated sewage, water-soluble solids dumped offshore, carbon dioxide from heating plants, and lead and carbon monoxide from motor vehicles and aircraft.

Pollution—a threat to wildlife and man

The effects of this constant and increasing contamination of the air and oceans are already apparent. Some wild species have declined dramatically. The brown pelican has all but disappeared as a breeding species on much of the Pacific Coast and around the Gulf of Mexico. There has been a sharp decline in the nesting success and numbers of bald eagles and ospreys in eastern United States. All of these birds feed heavily on fish, which absorb the persistent pesticides and store them in their tissues. DDT is considered a major culprit in the decline of these birds, as it is in the virtual extinction of the peregrine falcon in eastern North America.

A chilling threat—not only to wildlife but to all life is seen by some scientists today in the cumulative effects of pollution on the oceans. Marine phytoplankton are the basic of food chains in the seas. Without these microscopic plants, all ocean life from the smallest shrimp to the largest whales would perish. Moreover, phytoplankton have approximately three times as much gross capacity for converting carbon dioxide to usable oxygen as all land plants combined. Their present abundance is essential, these scientists believe, to maintain the oxygen content of the atmosphere at a level that will support life.

But phytoplankton are extremely intolerant of acidity and trace elements, which are common in most pollutants, including pesticides. When carbon dioxide—a near universal by-product of human activity—is absorbed by sea water in quantities beyond those that marine plants can readily convert to oxygen, it creates an acid condition that kills the phytoplankton. Trace elements in other pollutants cause the death of more. If too many die, according to this sobering theory, the oxygen content of the atmosphere will fall, and Earth will become another dead planet.

The trend can be reversed

How far down the line the world has progressed toward this grim end, no one is sure. But the rising quantities of carbon dioxide in the atmosphere and the fact that DDT has been found in the tissue of Arctic polar bears, Antarctic penguins, and many wild species between the poles are warnings of a possible trend in that direction.

The trend can be reversed, if Americans and people of other nations have the will, intelligence, and prudence to act promptly and vigorously to cure the Earth's environmentals ills. Wildlife that is threatened by air and water pollution and by the destruction of essential vegetation, soil erosion, and a general degradation of the environment can be saved.

By saving wildlife man may save himself.

Wildlife Management
Institute
Washington, D. C.

The Persimmon

By Mrs. Grace S. Draper
Pleasant Garden

IS there anyone in the South, I wonder, who doesn't look forward to the first fall frost in October, the ripening of persimmons, and the tantalizing aroma that fills the house with the baking of the first pudding of the season? One of the joys of a fall outing for "city folks" and "country folks" is picking up a basketful of this fruit, as we have done many times.

The common persimmon *(Diospyros virginiana)* is a Southern tree, and our persimmon pudding is completely foreign to our Northern cousins.

Probably DeSoto was the first European to taste our persimmon; records of his expedition in 1539 reported that Indians offered the men loaves made of the fruits, and dried persimmons were found in deserted Indian villages. Later, in the 17th century, Capt. John Smith reported on the persimmon, to which the Indians of Virginia had introduced him: "If it be not ripe, it will draw a man's mouth awrie with much torment." During the Civil War, Southerners roasted the large brown seeds and brewed coffee from them.* Audubon painted his picture of the strange-looking opossums high in a persimmon tree, devouring its equally strange-looking fruits.

The tree seems to prefer to grow in old fields and along hedgerows, often in poor soil. It assumes a somewhat gnarled and twisted form in growth. It may grow up to 50 feet in height, but is generally a small tree with dark-colored bark (often encrusted with light green lichens) that grows in deeply-ridged squares, similar to old dogwoods and blackgums. The shiny green leaves change to yellow before they fall, and beware picking the fruit from the tree at this time for it is a light orange in color and very sharp and bitter—as Capt. John Smith and many of us have found from experience! However, after frost—and the old-timers tell us this the proper time to pick up persimmons—the fruit assumes a purplish-brown cast, prune-like wrinkles, and falls to the ground, where each piece is eagerly gathered by us for cooking, or by quail, foxes, opossums, raccoons, squirrels, and other animals. Squirrels will cut branches from the trees recklessly in an effort to obtain the fruits as they ripen. The little four-petalled calyxes beneath the fruits are collected by flower arrangers for use in nut rings, dried plaques, etc.

Somewhat surprisingly, the persimmon belongs to the ebony family, and there are some 200 species in the Southern regions of the world. However, only two are native to our country—one restricted to Texas, the other, our familiar common persimmon. The genus name, *Diospyros,* is Greek and translates "fruit of the gods"; the species name refers, of course, to the state of Virginia. The wood has been used for shuttles and golf-stick heads, but otherwise it has little commercial value.

We Southerners, I believe, will cherish each tree fondly for its fruit! And some trees *do* have better-tasting fruit than others; these should be carefully singled out by those who relish eating the fruit, fresh or cooked. For those who would like to add another family recipe to their file (and almost every family has its own version of this recipe, handed down through the years), here is our recipe. It is a delicious cake-like pudding, and can be served hot or cold; also, it can easily be frozen for warming up when "company's comin' ".

PERSIMMON PUDDING

Sieve about 1 qt. ripe persimmons in order to obtain 2 cups of pulp. (If persimmons are dry, add little water to pulp when sieving.)

Beat in: 3 eggs
1-¼ cup sugar
1-½ cup sifted flour
1 tsp. baking powder
1 tsp. soda
½ tsp. salt
½ cup melted butter
2 cups whole milk
1 tsp. vanilla flavoring
1 cup raisins

Bake the pudding in a greased 9 x 9" baking dish (or in Teflon baking dish), in a moderate oven (325°) until firm—about 1 hour. It will be a chocolate-brown in color, slightly crusty around edges.

Cut in squares when slightly cooled, and serve either plain or with whipped cream. ◆

*"Familiar Trees of America", Wm. C. Grimm, Harper & Row, 1967.

The first Thanksgivings were pioneer feasts held in Virginia and Massachusetts in the early 1600's. Almost all of the variety of meat on the tables consisted of game. Able hunters among the early settlers provided it.

This November as we observe Thanksgiving, it is still possible for Americans to go out and take with their guns nearly every species of game that graced the original Thanksgiving menus.

Forests have been cut away, hillsides eroded, waterways changed and polluted, but Americans in most sections of our country still enjoy good hunting and the fruits of the chase.

For this and for the whole basis of the present campaign against air and water pollution in general, we can thank a few pioneers of the present century —the early conservationists who turned the tide of extermination and saved our game from extinction.

Almost to a man, these giants of conservation who led the way for the millions today were hunters. Notable among them was President Theodore Roosevelt, both an ardent hunter and a dedicated conservationist.

Virtually unnoticed until lately, the relatively small bands of devoted men not only preserved much of the wildlife of America —they increased and expanded it. It has been said that there may be more deer in the U.S. now than when the first white settlers arrived. Pheasants and other game breeds have been introduced. Wildlife sanctuaries and broad refuges have been established. The National Wildlife Refuge System alone embraces 28.6 million acres.

True, the passenger pigeons that once darkened unpolluted blue skies have been hunted out of existence. The buffalo that blackened the prairies are but a tiny remnant of the awesome thundering herds. But market hunters and commercial exploiters, not sportsmen, accounted for their extinction. To blame it loosely on "hunters," implying sportsmen as some do, beclouds the truth.

The National Wildlife Federation, the Izaak Walton League and many statewide and local organizations have fought the good fight for decades to preserve not merely game but all forms of creature life—fish, birds, and larger mammals and their habitats.

The National Rifle Association of America, a recognized partner of long standing in the conservation field, is proud to be associated with these efforts. The NRA has spoken out through the years in behalf of conservation. Its representatives have appeared by invitation at Congressional hearings, supporting conservation bills.

Among more than a dozen bills in recent years, the NRA has backed the "Endangered Species Bill" to prohibit interstate trade and importation of any animal or part thereof (such as skin) considered to be rare or in danger of extinction; the Dingell, Scott, Hart and Metcalf bills to make half of the present Federal excise tax on handguns available for wildlife restoration, receipts from the 11% excise tax on long-arms already being available for this purpose.

The NRA's Hunting and Conservation Section in 1969 distributed an NRA Conservation Action Handbook to all Federal lawmakers, State Governors, State Fish and Game Departments, Cabinet Members, a number of schools, and many others. This work won plaudits from many in high places. Long before the news media in general recognized the threat of extermination to American alligators, The American Rifleman published a detailed warning on the subject. It did likewise with polar bears earlier.

Under the NRA Hunter's Code of Ethics, hunting members pledge themselves not only to obey all game laws and all rules of firearms safety but to "support conservation efforts which can assure good hunting for future generations of America."

Today, with American industry, commerce and households annually dumping 360,000,000 tons of solid wastes and about 200,000,000 tons of toxic chemicals and vapors into the air, the problem of preserving life extends to humans as well as wildlife. Ecology and environmentalism have become popularized names for recognized public problems. Sportsmen and a few enlightened officeholders saw the problems and acted in their own way to minimize them long years ago.

For, those organizations, including the NRA, which began the defense of our environment and its life in all forms a half century to a century ago, it is gratifying to witness the final, spreading realization that "something must be done."

Two of the largest States in the Nation gave clear evidence of their awareness this year, and deserve public appreciation accordingly.

California is observing a "Century of Conservation." When it began its program in 1870, primarily to conserve fish, the State had a population of 560,000. Now

KNOW YOUR PROTECTOR

Fred R. Capps, Jr.

Wildlife Protector Fred R. Capps, Jr., stationed at Valdese, Burke County, was born March 30, 1944, at Hendersonville, N. C. He is a graduate of Hendersonville High School.

Protector Capps completed the Basic Recruit School at the Institute of Government in Chapel Hill in July 1967. He was employed as a wildlife protector at Valdese on January 1, 1968. Protector Capps had attended Basic In-Service, Investigative Techniques, Pursuit Driving, and Defensive Tactics Schools. He is a member of the Southeastern Assocation of Game & Fish Commissioners, Law Enforcement Section, Burke County Law Enforcement Association, National Rifle Association, and is a Hunter Safety Instructor.

Protector Capps served three years in the Army at Fort Sill, Oklahoma and in Korea.

DIVISION ENFORCEMENT RECORD FOR DEC., 1970

HUNTING & FISHING	
Persons checked	13,569
Total prosecutions	867
Total convictions	820
Total cases not guilty	30
Total cases nol prossed	16
Total cases dismissed	1
Total fines collected	$ 9,563.00
Total costs collected	$12,676.60
BOATING	
Persons checked	195
Total prosecutions	44
Total convictions	42
Total cases not guilty	1
Total cases nol prossed	1
Total cases dismissed	0
Total fines collected	$ 310.00
Total costs collected	$ 537.00

All fines and any arrest or witness fees are paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the North Carolina Wildlife Resources Commission or its personnel.

it has 20,000,000 plus. Its first comprehensive game law, in 1901, limited hunters to three bucks a year, set 50-bird limits on duck and doves, and outlawed sale of most game. Thanks to such farsighted measures, hunting is still good in California today. Its $20,000,000 conservation program is carried out by 1,300 employees—and every cent of the cost is met by the State's 3,000,000 sportsmen without tapping other taxpayers for a cent.

Pennsylvania, with more than a million resident hunters, is a prime example of an Eastern State whose long-range, expert conservation programs have built up remarkable stocks of game of many kinds. Every year, Pennsylvania hunting attracts more than 100,000 non-residents. In that State, hunting has become not only a pleasure to multitudes but a distinct asset to the Pennsylvania economy. Small wonder that Gov. Raymond P. Shafer has designated Jan. 16 as "Hunt Safely in Pennsylvania Time."

With the unstinting aid of NRA volunteer instructors, Pensylvania is among the 41 States which have given nearly 5,000,000 younger hunters courses in hunting safety, measurably reducing accidents in the field.

So it comes down to this: With a far greater population and much less open land, we the United States can support many more hunters and as much or more game than ever before, amid conditions of relative safety which shame some other activities and sports.

Harkening back to the early Thanksgivings, Navy Chaplain B. W. Long last year delivered a Thanksgiving message sent us by his son, NRA Life Member James B. Long, of Honolulu. It points out that the spiritual ingredients of the first Thanksgivings were based on the Bible, the firearm and the American dream. It concludes appropriately:

"As we sit down to our Thanksgiving dinner this year, we are conscious of the fact that we still have much to learn from the Book and that in our savage world the gun is still necessary to safeguard our way of life and that the dream has not yet been fully realized. But the basic elements of Thanksgiving are just as necessary and just as valid today as they were on the first Thanksgiving Day."

The American Rifleman

28 GAUGE GUN

Dear Sir:

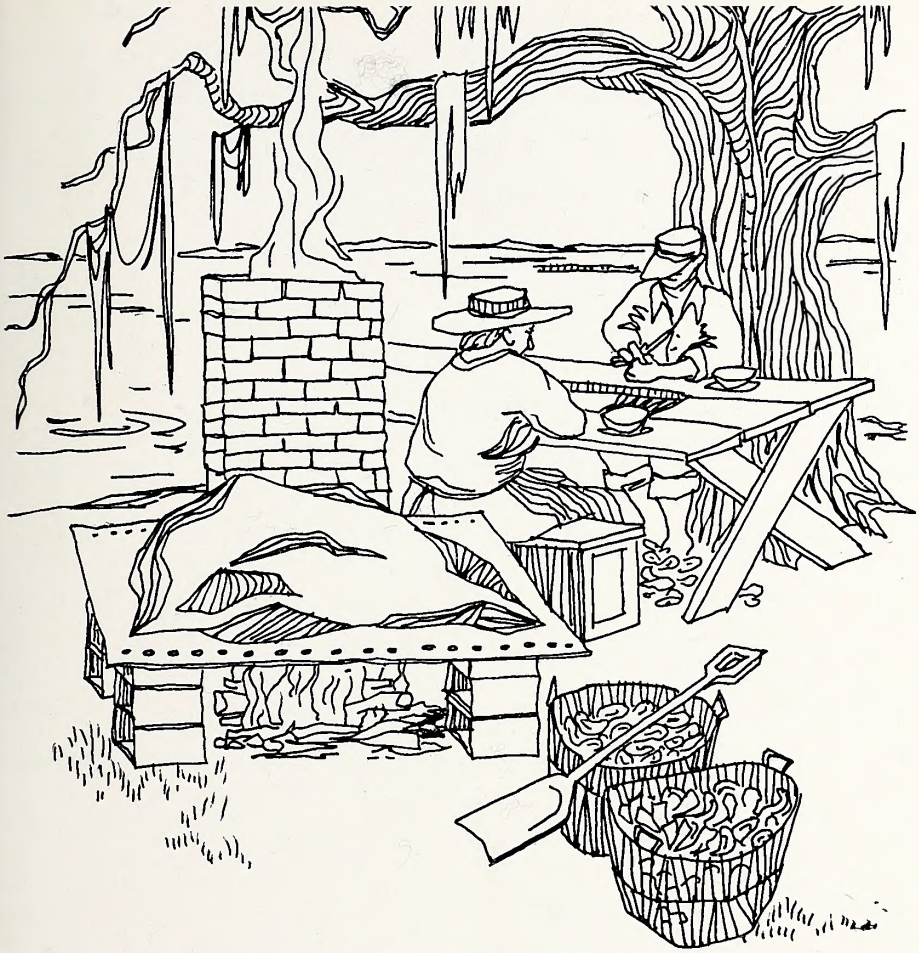
Last summer I decided to buy a bigger and newer gun. I priced some of the guns in Sylva and they ran around $35.00. A day or two later we went up to my uncle's and I told him I was going to get a new gun. He told me if I would give my half share of the other gun and come up when I got the new one and go hunting with him he would give me $20.00 on it. He gave me the $20 and I hunted with my dad for about two weeks for the best gun and best buy.

One store in Sylva gave us the best buy on all guns so we decided to get the gun there. The next day after school I went to see if my dad had got the gun and the man who worked at the store told me that he had it and told me it was a 28 gauge shotgun. I said to myself "Is he crazy or what?" because I never had heard of a 28 gauge shotgun.

That night when my dad got home I asked to see the gun and he showed it to me. The gun was a 28 gauge Winchester made in Canada. The gun had shot about a half of a box of shells.

That evening we got out and shot the gun and it shot fine. Now I believe it shot as well as a 20 gauge and maybe better.

If anyone would like to ask me anything about the gun, I will try to help you. Write: Gene Hoyle, Route 3, Box 126, Sylva, North Carolina 28779.



BOOK REVIEW: The Beachcomber's Handbook of Seafood Cookery

The problem with most cookbooks is that they are about cooking. Now, this is no great fault in the minds of those who like to cook, but it leaves those who merely read or eat with a howling hunger.

Hugh Zachary avoids this by carefully blending the ingredients of his book "The Beachcomber's Handbook of Seafood Cookery;" and the result is a delightful home-grown product of whimsey, information and entertainment which fleshes out the bones of a remarkable number of practical seafood recipes.

One thing is apparent—and Zachary both admits it and refuses to apologize for it—and that is his preference for seafood cooked in a simple manner. He is not overly fond of recipes which disguise the flavor of fish, oysters, crabs and other forms of seafood under a layer of sauce. Some may disagree with Zachary on this point, but his approach is certainly refreshing to those who have experienced culinary disasters on the part of spurious gourmets who would have been far better off frying the critters. Seafood has its own excellent flavor, and it is usually a mistake to try to improve it unless you know exactly what you're doing.

Not being a cook, I am hardly qualified to comment on the recipes except to say that I am persuaded to try some of them. My wife has read the recipes and likes them, although since she is from Maryland, she was a little put off by the absence of a traditional recipe for highly seasoned, steamed hardshell crabs. Alas, these Marylanders are a proud race, but I'll have to admit they are up on what Zachary calls "crabology."

Despite this one point, I find the book fascinating, not only because Zachary writes well, but also because of his obvious affection for the Carolina coast and its way of life.

He speaks with expertise on everything from cleaning the catch to cooking a blowfish.

The book is illustrated with line-drawings by Claude Howell, and sells for $4.95. It is published by John F. Blair, 404 N. C. National Bank Building, Winston-Salem, N. C. 27101.

I don't see how anyone who spends any time on North Carolina's Outer Banks can afford to be without it. **By Jim Dean**

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PHOTO BY FRED PICKLER

How's The Weather?

Legend has saddled the groundhog with the responsibility of predicting just how much more winter weather we can expect . . . and all on a whim of his emergence on a fair or overcast day the second of February. Please don't see your shadow, Mr. G!

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Wildlife IN NORTH CAROLINA

25 CENTS / MARCH 1971

PHOTO BY HARRY KNICKERBOCKER

Bright Day

The bright days of March hold out the promise of balmy breezes before long. These gulls hover in the chilly air in hopes of a handout of food. It's a bit difficult to ignore their shrill cries.

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION
RALEIGH, NORTH CAROLINA

SUMMARY OF 1971 TROUT REGULATIONS ON WESTERN GAME LANDS WHERE A SPECIAL FISHING PERMIT IS REQUIRED [1]

CLASSES OF REGULATIONS (Regular Season) [2]

TROPHY TROUT REGULATIONS
a. Creel limit - 1 trout
b. Size limit - brook trout 12", rainbow trout 16", brown trout 16"
c. Lures - artificial flies

NATIVE TROUT REGULATIONS
a. Creel limit - 4 trout
b. Size limit - brook trout 6", rainbow trout 10", brown trout 10"
c. Lures - artificial lures

GENERAL TROUT REGULATIONS
a. Creel limit - 7 trout
b. Size limit - none
c. Lures - bait or artificial lures

GAME LAND	STREAM (INCLUDING UNLISTED TRIBUTARIES)	SECTION	MILES	COUNTY	REGULATION	FISHING DAYS
BEAVERDAM	Beaverdam Creek	Entire	5	Buncombe	General	Sat.-Sun.-Wed.
BLUE VALLEY	East Overflow Creek	Entire	7	Macon	General	Sat.-Sun.-Wed.
	West Overflow Creek	Entire	6	Macon	General	Sat.-Sun.-Wed.
CANEY FORK	Caney Fork	Entire	20	Jackson	Native	Sat.-Sun.-Wed.
DANIEL BOONE	Lost Cove Creek	Entire	5	Avery	Trophy	Daily
	Wilson Creek	All in refuge	3	Avery	Trophy	Daily
	Upper Creek 3/	Entire	9	Burke	Native	Sat.-Sun.-Wed.
	Steels Creek 3/	Entire	8	Burke	Native	Sat.-Sun.-Wed.
	South Harper Creek	Entire	3	Avery	Native	Sat.-Sun.-Wed.
	North Harper Creek	Entire	5	Avery	Native	Sat.-Sun,-Wed.
	Harper Creek	Entire	2	Avery	Native	Sat.-Sun.-Wed.
	Gragg Creek	Entire	2	Avery	General	Sat.-Sun.-Wed.
	Rockhouse Creek	Entire	4	Avery	General	Sat.-Sun.-Wed.
	Craig Creek	Entire	2	Avery	General	Sat.-Sun.-Wed.
FIRES CREEK	Fires Creek	Entire	17	Clay	Native	Sat.-Sun.-Wed.
FLAT TOP	Big Creek	Entire	4	Yancey	General	Sat.-Sun.-Wed.
HARMON DEN	Cold Spring Creek	Entire	4	Haywood	General	Sat.-Sun.-Wed.
MT. MITCHELL	South Toe River	Above fish barrier	14	Yancey	Native	Sat.-Sun.-Wed.
	Neals Creek	Entire	3	Yancey	Native	Sat.-Sun.-Wed.
	Rock Creek	Entire	4	Yancey	Native	Sat.-Sun.-Wed.
	Middle Creek	Entire	4	Yancey	Native	Sat.-Sun.-Wed.
	Curtis Creek	Entire	4	McDowell	General	Sat.-Sun.-Wed.
	Newberry Creek	Entire	3	McDowell	General	Sat.-Sun.-Wed.

STATE OF NORTH CAROLINA

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GOVERNOR

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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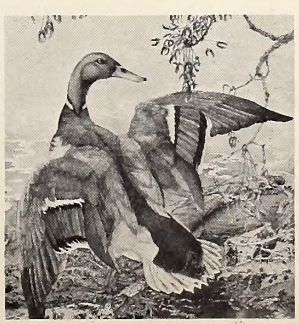
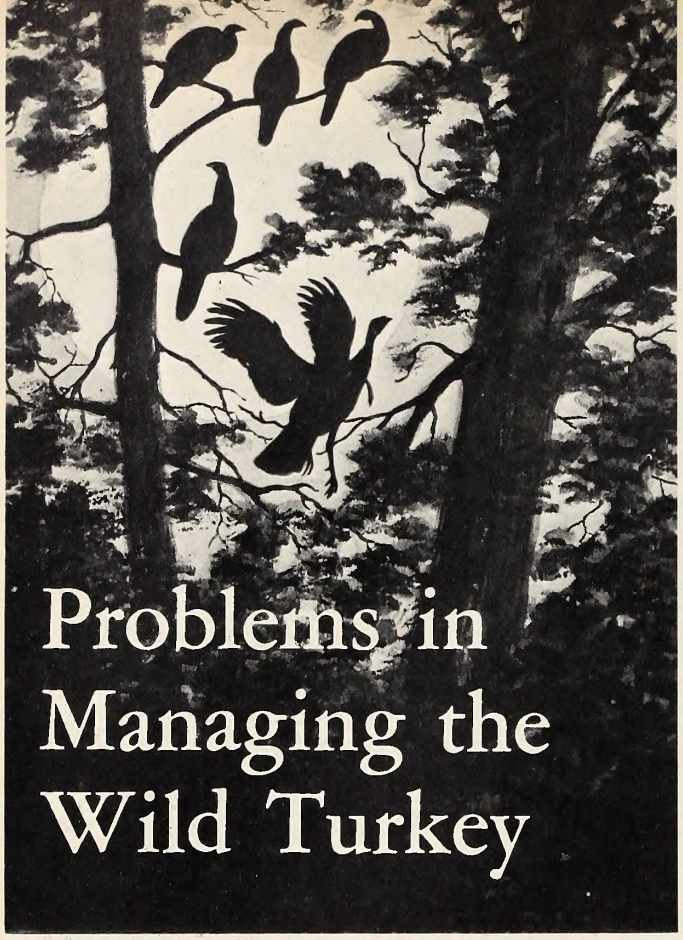


The warmth of early spring stirs many living things, waterfowl among them. This mallard drake preens his spring plumage amid the maple seeds and thinks of the nesting grounds which may be the next stop on his schedule. The number of birds returning to nest and the condition of the pot holes and marshes will decide how many ducks come back next fall. Painting by Sallie Middleton.



Problems in Managing the Wild Turkey

Questions concerning winter, male-only turkey seasons and the use of dogs are discussed by the author, one of the top turkey experts in the United States today.

By R. W. Bailey
Leader, Wild Turkey Restoration Project
ILLUSTRATIONS BY WALLACE HUGHES

THE statements that follow *presuppose* that big turkey management problems exist in North Caroline as a result of shrinking ranges and populations in Piedmont areas and that changes in concepts, hunting procedures and regulations may be necessary to halt the downward trend. The emphasis on "presuppose" underscores the fact that precise information is unavailable. This shortcoming may be reduced in the next few years through periodic preparation of range and accumulation of meaningful population and harvest data through mail surveys, checking and tagging systems, and field investigations.

In the meantime, all responsible hunters and wildlife authorities need to do some hard thinking about the pressing turkey problems. The following is an attempt to present the various problems, particularly those relating to current winter season regulations and hunting procedures. The arguments that have been heard in support of the current winter season regulations appear below in BOLD TYPE, followed by an appraisal based on information and experience of the author.

1. SINCE ONLY MALES ARE LEGAL, WINTER HUNTING AFFORDS MUCH RECREATION AND DOES NOT HARM THE POPULATION. IT CAN PROVIDE A WONDERFUL WINTER SPORT WHERE SUFFICIENT POPULATIONS EXIST.

The evidence available indicates that turkey hunting is largely nonselective in regard to sex and is therefore a factor in the low or declining populations. The turkey is such a tempting target that it may be presumptive to expect most hunters to exercise a high degree of selectivity in regard to the sex of the target. Selectivity is usually difficult under field conditions.

A long-established tradition is hard to break. Traditionally, winter turkey hunting is by use of dogs which are trained to locate and scatter flocks. More often than not, flocks consist of hens and their young-of-the-year. When dispersed, these turkeys are easily "called up" and killed or are shot from trees where they seek escape from the dogs upon which their attention is usually riveted.

Winter hunting may be largely responsible for the Piedmont's decreasing turkey population.

2. ABOLISHING THE WINTER SEASON WOULD NOT HELP THE TURKEY BECAUSE TOO MANY HUNTERS WOULD CONTINUE TO SHOOT TURKEYS WHEN THE OPPORTUNITY ARISES. REPORTEDLY, SUPPORT FOR CLOSING THE WINTER SEASON OFTEN COMES FROM VIOLATORS WHO WANT THEIR COMPETITION REDUCED.

True, but to what degree is unknown. Closure to winter hunting apparently resulted in an increase in turkeys in our coastal areas and an increase is occurring in our western counties where spring-only hunting prevails. Nearly all states without winter seasons, or with emphasis on spring seasons, have increasing populations. Surely a substantial number of our hunters are law abiding. When a game population is in trouble, the prime objective must be to give it as much help as possible. The State fails its responsibility when its laws are too liberal for the good of the resource population. The State sets the rules by which hunters must govern themselves; if hunters do not abide by the rules, they fail their responsibility.

The present regulations which permit "male-only" shooting in winter are of dubious value in preventing the shooting of hens. Abolishment of winter turkey hunting would be more enforceable than present laws regarding winter hunting and much more effective in protecting the valuable hens. To offset the recreational loss that would result from abolishment of the winter season, spring gobbler hunting can be liberalized considerably, providing maximum recreational use of the resource without damaging, and possibly even benefiting, the resource.

Turkey hunting as a sport in North Carolina, and perhaps the very existence of the bird may depend on a closer look at hunting procedures. The future of this fine game bird is in the balance.

3. MANY NORTH CAROLINA TURKEY HUNTERS USE DOGS. DOGS ARE NEITHER PERMITTED NOR ARE THEY PRACTICAL IN SPRING HUNTING. REDUCTION OR ELIMINATION OF WINTER SEASONS WOULD ADVERSELY AFFECT DOG OWNERS.

Very true, but severe reduction or extirpation of the resource eliminated the sport (and livelihood ?) of the buffalo, elk and passenger pigeon hunters in North Carolina a few generations ago. Winter turkey hunting range could be expanded if it were possible to eliminate the use of dogs. If curtailment of winter hunting and/or use of dogs is necessary to preserve a spring-huntable population, who will stand up and say that he is unwilling to make the sacrifice? Borrowing a line from Aldo Leopold, maybe the time has come for Tarheel hunters to "enlarge themselves rather than press for large bag limits and long seasons."

Henry E. Davis, one of the outstanding turkey hunters of all time, stated in his book (Page 131) "The American Wild Tukey" that advocates of using dogs in hunting turkeys ". . . claim that it saves much leg work, enables the hunter to cover (more) territory, that a drove can be better scattered, that the hunter gets a great thrill out of seeing his dog work, and . . . that it is fine to have a dog to catch wounded birds. All of which are flimsy excuses for indulging in the practice . . . it is an admission that the hunter employing it has no hunting skill and is forced to seek the aid of a dog to make up for his own deficiencies."

After further elaboration on the use of dogs in hunting turkeys, Davis concluded (Page 132): "Personally, I have no patience with the employment of dogs for any type of turkey hunting. It is meat hunting, pure and simple, and all the camouflaging cannot make anything else out of it. If a man does not have the hunting ability to locate turkeys without a dog, he should stay out of the woods and not try to fool himself into believing that he is a hunter."

4. MANY NORTH CAROLINA TURKEY HUNTERS PREFER WINTER HUNTING OVER SPRING HUNTING.

True. Wildlife authorities also want winter hunting, even "either sex" hunting, where turkey populations, habitat conditions and hunting pressures will allow it. But is winter hunting warranted in North Carolina where it may jeopardize the population, where the range has shrunk to the point that the turkey population is probably below—perhaps well below—10,000, and where nearly 500,000 hunting licenses are sold annually? Particularly, is winter hunting warranted in that part of the State —the Piedmont—where human populations are densest and increasing most rapidly, presenting the possibility of eliminating the turkey within our lifetime?

5. THE TURKEY POPULATION IS GOVERNED BY THE HABITAT RATHER THAN BY HUNTING; THUS WE MAY AS WELL CONTINUE TO HUNT IN WINTER WHILE THERE IS STILL SOME RANGE.

While the statement has much validity, it cannot be denied that:

a) unlike some small game species, the turkey *can* be overhunted
b) in marginal range it is *easily* overhunted
c) where extended periods of harassment are prevented fine populations can be maintained even on marginal range (example: Camp Lejeune)
d) the reported population increase in areas recently closed to winter hunting suggests that the turkey's numbers can be increased through changes in regulations.

Turkey restoration in North Carolina is a two lane road—land management and harvest regulations. These lanes must parallel and complement each other if the turkey is to escape oblivion. The turkey is adaptable. It *can* tolerate large numbers of humans as has been repeatedly shown on military bases, national and state parks, etc.; but it

An additional serious problem is the destruction of wild turkey nests by roaming dogs. The preservation and increase of the turkey depends on many factors.

cannot tolerate human persecution in the form of excessive hunting. (The wonderful aspect of a spring season is the near-impossibility of overhunting.)

The land management road to restoration (or extinction) is determined by economic factors and is uncontrollable. The habitat is going to change and usually for the worse. Turkeys are going to be made more vulnerable to the gun. If our laws don't stay abreast of these changes, the trend leads inexorably to extinction. The habitat is changing rapidly, our laws slowly.

6. CURRENT TURKEY HUNTING LAWS ARE ADEQUATE. THERE IS NO EVIDENCE THAT WINTER HUNTING IS ADVERSELY AFFECTING THEM.

The previously-mentioned population trends in our coastal and mountain areas refute this statement. Of three range maps—covering the last three decades—in the Commission's files, a continuing decline is evident in all areas except the mountains. While much of the decrease is surely due to habitat changes, decreases also appear to be widespread in areas where few or no adverse environmental changes have occurred (example: Uwharrie National Forest).

It appears that we are faced with seven alternatives with respect to regulations. They are listed in *ascending order of concern* for the *resource,* namely the *wild turkey*:

1) continue present liberal regulations, risking possible further decline of the turkey in the Piedmont
2) shorten the winter season
3) reduce winter season bag limit to one bird
4) reduce winter season bag limit to one bird and shorten the season
5) ban the use of dogs in turkey hunting
6) ban dogs, reduce winter bag limit to one, and shorten the season
7) eliminate the winter season and liberalize spring seasons to greatest extent feasible.

In summary, all will no doubt agree that there is no scarcity of turkey problems in North Carolina. Where there is any doubt at all about the future of such a valuable and magnificent resource, a "better safe than sorry" policy would obviously be the wisest, at least until better information suggests otherwise. Thus, those who insist on continuance of the long winter season with a two-bird limit and the use of dogs (they are the "traditional" turkey hunters who have the most to lose if the turkey disappears!) should ask themselves some serious questions:

1) are we adhering to a pattern that places the sport in jeopardy and which may rob our sons —even ourselves—of the privilege of turkey hunting?
2) are our actions and attitudes motivated primarily by consideration of
   (a) the needs of the resource and (b) the need for posterity to have an opportunity to manage that resource? Maybe the next generation can do a better job of it than we have done. At least it should have the opportunity.

I see no alternative except to recommend a spring-only turkey season in all of North Carolina, at least for a few years until we can establish a program that will enable us to keep sensitive fingertips on the pulse of the turkey's ever-changing status. I will be pleased to hear from those with contrary views. It would be a pleasure to be proved in error, because I have been a lifelong "winter" hunter of turkeys and would welcome the opportunity to continue to indulge myself with a clear conscience. ⬍

Those Baffling Birds

By Milton C. Jordan
Wilmington, N. C.

PHOTOS BY
HARRY KNICKERBOCKER

WHEN you awaken each morning to the cheery chirping of your favorite bird, what do you think? When you watch a hawk, hummingbird, or some other winged creature soaring, flittering or gliding through the wild blue yonder, what do you see? Most people take birds for granted. They see them as just another fixture in the scenery, and if pigeons are any example, a rapidly disappearing fixture at that. Birds are invariably thought of as being in the "simple animal class".

Just the opposite, however, is true. Birds, more than 25,000 species, are amazingly complex creatures of flight. These feathered marvels of nature have dozens of different types of highly specialized equipment such as "rudders", "stabilizers", "air frames", and 'ailerons". Their fantastic navigational equipment is so advanced that our most modern aircraft cannot compare with it for accuracy. Birds also have a wide array of landing gear and sea and air search equipment.

North Carolina is not without representation birdwise. From the mountains to the coast, birds of all sizes, shapes and varieties populate the Tarheel state. They range from the darting hummingbird which hovers in mid-air like the helicopter and flies backwards like the copter almost does, to the majestic gulls that soar along our coastline, snatching morsels from the waves.

Man stands in awe and marvels at the Vertical Takeoff and Landing aircraft (VTOL) while there are birds that have been doing this for centuries. As a matter of fact, when compared with the superior aerodynamic structure of birds, our aircraft is primitive. There are still questions unanswered about birds and how they perform the amazing feat of flight.

"Thousands of papers have been written on the aerodynamics of bird flight, but a bird's wing with its many flexible moving parts which twist and bend under the pressure of the air, particularly in flapping flight, defies the sort of critical analysis to which we can subject the rigid wing of an aircraft. Wind tunnels, smoke screens, and mathematical formulas fail to give us more than an inkling of the answers. Perhaps electronic computers may someday help us define the forces acting on the wing of a bird in flight." *(The Birds,* Life Nature Library, p. 39)

Ornithologists have discovered that the bird's wing performs the function of both wing and propellar, and high speed photography has shown the mechanics of bird flight to be tremendously complex. The flight feather, for instance, is called by scientists, "a marvel of natural engineering."

"It (the feather) is at once extremely light and structurally strong, much more versatile than the rigid structure of an aircraft's wing—and far more readily repaired or replaced when damaged." (ibid).

Blue herons, those soaring kings of the water, that provide such artistic attractions to the backdrop of a summer sunset, are cases in point. Though

they often merely skim the waves, their feathers never become waterlogged. And even on days when the temperature drops to overcoat levels, gulls seemingly maintain rather constant body temperatures. Feathers play an important role here.

Wesley Lanyon in his book, "Biology of Birds", describes this marvelous quality of feathers.

"Feathers provide smooth and streamlined body contours which are essential for reduction of air friction and turbulence and, when properly groomed, are completely waterproof. They form one of the most efficient types of insulation known because of the profusion of dead air spaces that they enclose and thereby aid in maintaining the bird's high body temperatures." (Biology of Birds, pp. 17, 18)

The great blue heron, a frequent visitor to our shoreline is known locally by several names, including "Big Cranky", "Blue Crow", "Long Tom", and "Poor Joe", this long-legged beauty carries with him several local traditions.

One such story about "Big Crank" is that he possesses one, long straight intestine. Another tale asserts the bird has a cluster of phosphorescent feathers on its breast, the light of which at night lures fish to within striking distance of the long, dagger-like beak.

The great blue heron is more often sighted in Carteret, Onslow and Brunswick counties.

Another part of a bird's body that is a highly specialized tool is the beak. A casual observation of bird beaks raises several questions. Why do birds that are basically insect feeders have short, thin beaks which they use as forceps in picking food from vegetation? Why do woodpeckers have chisel-shaped beaks with which they remove wood in search of instects?

Black skimmers, found along our coastal waterways, have specialized beaks. Easily indentified because of its distinctive appearance, habits and voice, the skimmer flies low over the water, cutting the surface with the lower section of its beak and scoops up minnows and sometimes shrimps on which it feeds.

This bird as well as other fishing birds also have serrations along the edge of their beaks to enable them to firmly grasp their wriggling prey.

Another excellent example of a beak being uniquely designed for its job is the chisel-like beak of the American oyster catcher, sometimes called the clam bird. This black, brown and white bird with the long red beak is the most colorful denizen of the beaches. It runs rapidly, gives forth a shrill call when endangered, and feeds on shrimp, clams, etc.

The oyster catcher is the little fellow you see on the beaches running back and forth with the waves. When the tide goes out, exposing oyster bars on mud flats, he comes out quickly, and drives his beak between the partly opened shell of the oyster, quickly cutting the adductor muscle and devours the juicy bivalve.

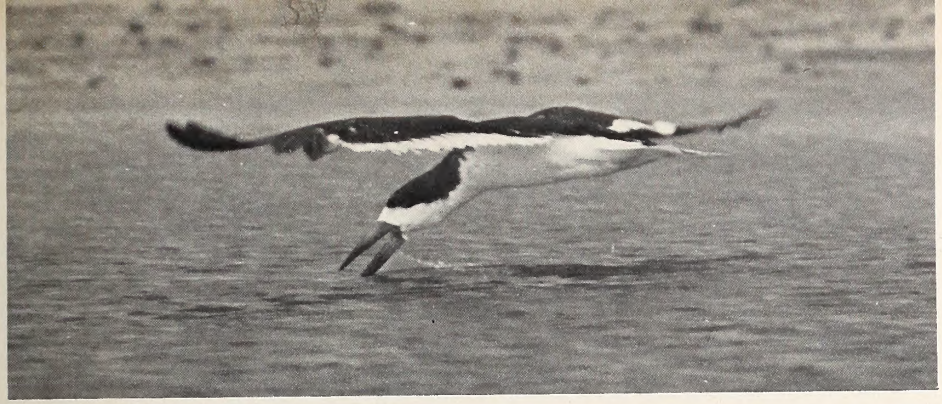
A startled snowy egret jumps in wide-eyed fright, its powerful wings pushing it into the air in a twinkling. Birds display many abilities that man has yet to duplicate.

Glover Allen in his book "Birds and Their Attributes", treats this subject of beaks: "A bird's beak serves it for knife, fork and spoon, as well as for hammer and chisel in many species. Its chief use is in connection with procuring food, so that we find, among birds as a whole, an extreme variety of shapes of beaks, adapted for gathering various kinds of food." (Birds and Their Attributes, p. 78).

Though birds are very pleasant and even helpful additions to the surroundings, too many of them can pose a definite problem. For two years now starlings have been disrupting the normal activities of the little town of Halifax in northeastern North Carolina. The starling has an interesting story because it is one of the few European birds which has been established in North America in the wild state.

First appearing in the Tarheel state in 1919 when one was shot from a flock of three in Pender County, the starling has since then ranged far and wide across the state and even the country.

Accompanied with other "blackbirds", the starling is often seen in flocks about towns and even in larger cities like Raleigh. It eats insects mainly, but also consumes grain, fruits and vegetables.



The oyster catcher skims the shallow water scooping food with its strong bill or beak. What's for lunch today?

The starling produces many notes and readily imitates the calls of various birds of the neighborhood.

During the winter months, starlings often establish large roosts, like the one in Halifax. As evening approaches the birds may be seen arriving first singly and then in small, loose flocks, until there develops a steady stream of arrivals from their feeding grounds, sometimes twenty or thirty miles away. They continue to pour in until darkness falls. Naturally, such great numbers of birds roosting in trees bordering sidewalks become quite a nuisance to people who dwell nearby or who have to pass beneath them.

Birds' uncanny ability to migrate thousands of miles each year without a navigational error is another mystery scientists have yet to explain,

The golden plover is an interesting case in this respect because of the distances of his routes. Nesting on the shores of the Arctic Ocean, the plover, after raising its young, gets out on one of the most awesome migrations imaginable. Flying southward, they cover an elliptical course of more than sixteen thousand miles. They cross Labrador, down to the tip of Nova Scotia and then navigate the wide Atlantic, completely bypassing the United States and finally wind up in their vast wintering area between Rio de Janeiro in Brazil and Buenos Aires in Argentina. On the return trip, plovers cross the Andes Mountains, fly across Panama and Central America, up the Mississippi Valley, and on to their home in the vast, remote Arctic.

Birds are undoubtedly some of the most interesting creatures around today. They completely defy any attempts to simply overlook them because they perform as a matter of course feats that man is just beginning to duplicate, and some he has not achieved yet. So the next time you wake up to the chirping of your favorite bird, don't just accept him as a part of the scenery, but consider him as very much a specialized and complex creature as you yourself, for indeed he is.

Hickory Time

If you consider yourself a fishing opportunist you will not let the relatively short hickory shad season slip by without trying these spring of the year scrappers. Iced line guides, or a March blow may greet you at one of the Neuse or Tar River hotspots so dress and act accordingly.

Hickories move inland in advance of water temperature increases, usually late in February or early March. They spawn when the water warms to about 54 degrees and are available to hook and line until early April (depending on water level, temperature, etc.). Including the smaller bucks (male), hickories will average less than a pound but many roe hickories will weigh in at one and three-fourths pounds plus or minus a few ounces. Even the smaller ones jump and make sizzling short runs.

Use your lightest tackle, preferably ultra light. While many types of spoons, jigs and even spinners will fool the hickory, the most popular lure in Eastern Carolina is the #1 and "0" sized silver finish Barracuda spoon, feathered if you prefer.

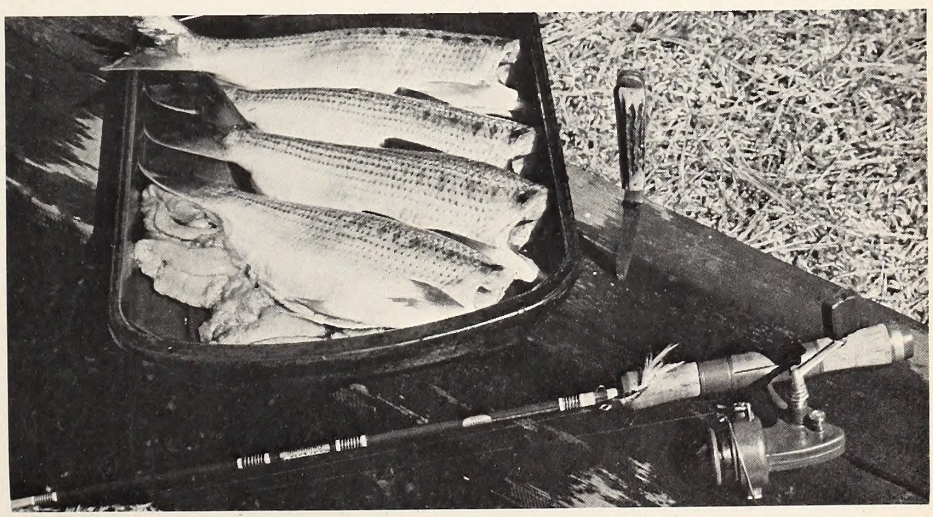


PHOTO BY JOHN R. PARKER

The delicate flavor of the hickory, such as the four above, will not be lost if baked or fried. The bone problem can be reduced to a minimum with proper handling in either of the two methods. Stew (muddle) appetites are usually held in check until the larger, less bony American shad shows up. But for now try the hickories.

John R. Parker, Jr.

The Raccoon

By Rod Amundson

A coon may not be able to whip his weight in wildcats, but pound for pound he can lick any dog unfortunate enough to become embroiled in a hand to hand combat. For sheer grit and courage, the coon has no peer in the animal world. Where other game animals depend on speed and craft for defense, the coon depends on his intelligence and his ability as a fighter.

The name "raccoon," or more commonly "coon," has been derived from an attempt by early settlers to spell the word "Arakun" used by the Algonquin Indians to name the animal. Altogether, there are ten subspecies of coons in America. The species native to North Carolina is named, in scientific terminology, *Procyon lotor lotor*. The generic name "Procyon" is derived in a somewhat far-fetched manner from the Greek words "pro" meaning "before" and "cyon" meaning "a dog," the latter being the name of a group of stars which rise above the western horizon just before the dog-star Sirius. The specific name "lotor" is a Greek word meaning "a washer"—descriptive of the coon's habit of washing its food.

Anyone familiar with this important game animal and fur bearer has little need of a detailed description. In general, adults weigh up to 15 pounds, with 24-25 pound specimens unusual and 50-pound specimens extremely rare. The general color is a grizzled gray and tan, with a distinct black mask over the eyes and almost white patches above the eyes which give the animal a studious expression.

The tail is long and bushy, with black rings which give rise to the name "ring-tail." Albinism is quite frequent, with a number of pure white specimens reported. A black phase, called melanistic, occurs quite frequently. The species native to Nebraska has produced a number of specimens which are a brilliant creamy yellow, almost identically the color of a "yellow tomcat." The fur of such individuals is beautiful beyond description, and much softer than the ordinary.

The feet of the coon have five well-developed toes with fixed claws. The soles are bare, and the hind feet plantigrade (walking on the heel, as in the case of bears). The front feet, or hands, are extremely dexterous. Owners of pet coons have observed their ability to unlatch doors, remove corks from bottles, and get into an endless detail of mischief.

History

Coons caught the imagination of early settlers and explorers. On no less an authority than Captain John Smith, the coon was described as ". . . much like a Badger, but living on trees like a Squirrel." The skins were early recognized as being valuable for making garments. Coonskin caps soon became the badge of the woodsman. Indians supplied a great number of coonskins to early traders, and the furs became popular in England, France, and Poland. Raccoon coats became extremely popular in collegiate circles in this country during the Twenties, and no well-dressed college man would think of attending a football game or a winter social function without the inevitable coonskin coat.

The pioneers, and many people today, considered the coon an excellent table dish. This fact, added to the value of the pelts, resulted in a terrific toll of coons over a long period of years until protection measures became necessary. In recent years, however, coon pelts have fallen off in market value, and although thousands are still taken each year the greatest worth of the coon is its value as a sporting animal. Despite the inroads made by trappers and hunters, coon populations seem to be holding up very well, and it is believed that the animal is still extending its range. It is one of a very few wild species which have benefited by the encroachment of agriculture. It is very fond of green corn and other grains, as well as orchard fruits and berries.

Behaviour

Anyone who has had a coon as a household pet knows that it is a very intelligent and unusual animal. It is endowed with a vivid curiosity and an infinite capacity for mischief. If left free to roam the house it will wreak havoc with bric-a-brac, and put the pantry in a state of pandemonium. It will make life miserable for any housecats that happen to be around, and is apt to give old Rover a severe case

of hysteria. Ordinarily coons will get along very well with other household pets, but in the case of squabbles, which are apt to arise with considerable frequency, the coon seldom comes out second best.

In the wild, the coon is strictly a night prowler, preferring to spend days asleep in a hollow log or tree, or in the sun in warm weather. His nocturnal search for food may take him from cultivated fields to woodlands to the courses of streams, the edges of lakes and ponds, or through swamps and marshes. Favored items of food such as frogs and crayfish are found near water, while other dietary items may be taken from the nearest lake or stream.

The coon is an excellent climber of trees, but has little ability as a runner.

Food Habits

Like his larger relatives, the bears, the coon is an omnivorous eater. He eats a variety of nuts, fruits and berries, will catch small fish stranded in flood pools, and happily wades into streams to turn over stones for crayfish lurking under them. He will spend hours in quest of frogs, either in their watery habitat or out in the tall marsh grasses. He is fond of fresh water clams, and even oysters. The taste for oysters is sometimes fatal. The coon tries to get the meat from oysters while the shell is open, but instances have been recorded where the inquisitive front paws have been trapped by the closing shell, and the coon drowned with the incoming tide.

Its appetite for green corn has gotten the coon in trouble with farmers, and at the same time exploded the theory that coons bathe all their food in water before eating it. Midnight raids on the poultry house have brought many a coon to an untimely demise at the receiving end of a load of shot. There have been instances of coons raiding beehives, but the activity occurred during cold weather when the bees were incapable of defending their store of honey.

Coons are very fond of turtle eggs. The writer spent a number of interesting hours on a moonlit night watching painted turtles come ashore to lay their eggs only to have them dug up and devoured by coons which prowled along the sandy beach.

Grubs, beetles, grasshoppers, and other insects form an important part of the coon's diet. Snakes and lizards are other items. Pet coons will eat almost anything edible, cooked or raw, with a special liking for sweets and pastry. Grapes are a favored item, and orchard fruits such as apples, peaches, plums, and cherries are included in the menu of both tame and wild coons.

Coons like to wash their food whenever water for such activity is available. They may take a frog or a crayfish dripping from the water and then wash it thoroughly before eating it. Where no water is available, coons will eat unwashed food.

Breeding

There is some argument as to whether coons are polygamous, but there is much evidence to indicate that males may mate with several females. The mating season begins in mid-winter, and the young are gestated for 63 days. Litters vary from three to six young, with four the usual number. Coons have a very definite family life, and many observers believe that males help with the family chores. The family group will stay together until a new crop of youngsters comes along. Parent animals take their young on foraging expeditions to teach them how to fish for crayfish, clams, and frogs. It is very doubtful that adults bring food to their young, but instead teach them to search for food at weaning time.

Houses may be made in hollow trees, hollow logs, crevices and caves, or the abandoned dens of other animals. Artificial dens of various types are accepted and are an important means of coon management.

Enemies

Other than men and dogs, coons have few natural enemies, since there are few animals or birds of sufficient strength to present a serious menace. There are a few internal and external parasites, but these seldom occur in sufficient number to inflict any serious damage. The coon is subject to certain seasonal periods which may cause hardship. During late winter and early spring months food is scarce, and the coon depends on stored fat for sustenance. During cold periods in winter months coons go into a period which is similar to but not actually hibernation. If food has been abundant during the fall, the animal is able to form enough fatty tissue to carry it through periods of adversity.

Management

Coons are creatures of the forest, and coon management is closely tied in with forest management. Selective cutting of forest trees may be modified to include leaving den trees for the benefit of the coons. Stands of mast-producing hardwoods provide an excellent source of food, and undergrowth in a properly managed forest will produce wild fruits and berries.

Controlled harvesting of coon populations is the most important single management measure. Coons are relatively prolific, although their fecundity cannot be compared to that of cottontail rabbits and squirrels. But they are tenacious of life, and the diversity of their diet makes it relatively easy for them to bear up well under heavy hunting and trapping pressure.

Various coon hunting clubs have made attempts at stocking coons, but often the new stock is imported from other states, and it is doubtful if coons imported from Florida, for example, can become sufficiently acclimated to establish themselves successfully.

A number of wildlife clubs are cooperating with 4-H groups and other rural youth organizations to set up artificial dens to benefit coons. Such practices are extremely beneficial to the species. ⬍⬍

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Public Hearings for Hunting Rules Announced

Once again the Wildlife Resources Commission will give Tarheel hunters and trappers a voice in establishing the 1971-1972 hunting and trapping regulations at the following set of public hearings:

May 4, 1971	District 9	Sylva	Courthouse	7:30 p.m.
May 5, 1971	District 8	Morganton	Western Piedmont Community College	7:30 p.m.
May 6, 1971	District 7	Yadkinville	Courthouse	7:30 p.m.
May 7, 1971	District 6	Albemarle	Courthouse	7:30 p.m.
May 10, 1971	District 5	Graham	Courthouse	7:30 p.m.
May 11, 1971	District 4	Elizabethtown	Courthouse	7:30 p.m.
May 12, 1971	District 3	Rocky Mount	City Court Room	7:30 p.m.
May 13, 1971	District 2	New Bern	City Hall	7:30 p.m.
May 14, 1971	District 1	Edenton	Courthouse	7:30 p.m.

Trout Season Opens April 3

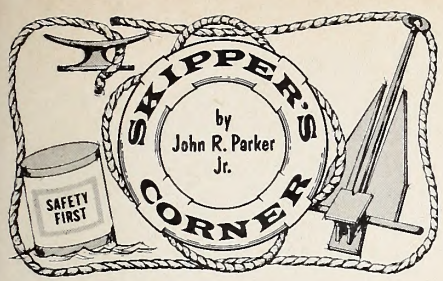
Tarheel trout angling begins April 3. By this time state and federal hatcheries will have completed pre-season stocking. In-season stocking of keeping-size trout will follow. More than 650,000 trout will be stocked prior to and during the mountain trout fishing season.

Game Kill Survey

The Wildlife Commission is conducting an important game kill survey during the months of March and April with approximately 8,000 Tarheel hunters solicited for answers concerning their 1969-70 hunting success. If you should happen to be one of the lucky 8,000, we urge you to complete the questionnaire and return it in the postage-free envelope provided.

Trout Publication

"Trout Fishing Waters of North Carolina" is a new volume published by the Graphic Press, 418 South Dawson Street, Raleigh, N. C. 27603. It contains maps showing all Tarheel trout waters, a description of each stream or lake and helpful information on how to find them. Price is $5.00 tax and postage included.



MARCH usually lives up to its reputation of making the state's often placid waters, move in a vertical as well as horizontal direction. Windy periods or a fast rising of the wind on any given day during the chilly months of March and April are leading factors in the first boating fatalities of each season.

Caution is always the password aboard any boat, especially small, small craft and especially during windy, cold-water days. Too many times has the skipper of a 10, 12, or 14 foot fishing skiff found too late that the general stability, free board, etc., of his prized fish getter was not going to see him through a blow.

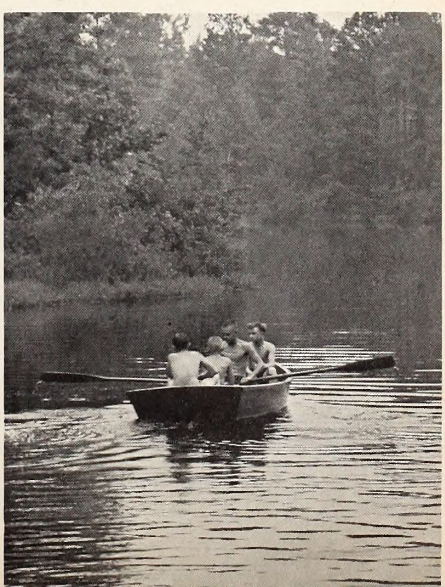
Records substantiate what many boaters and interested citizens know about boating fatalities. That is, the boats involved in most fatal accidents are the smaller, small craft. The 10- or 12-foot creek boat and even some of the economy or homemade 14-15 boats can be trouble makers. Usually larger boats, while they may not show nautical engineering genius have enough stability and flotation to keep you dry. This, of course, may not hold true if the boat is overloaded or handled carelessly in a blow.

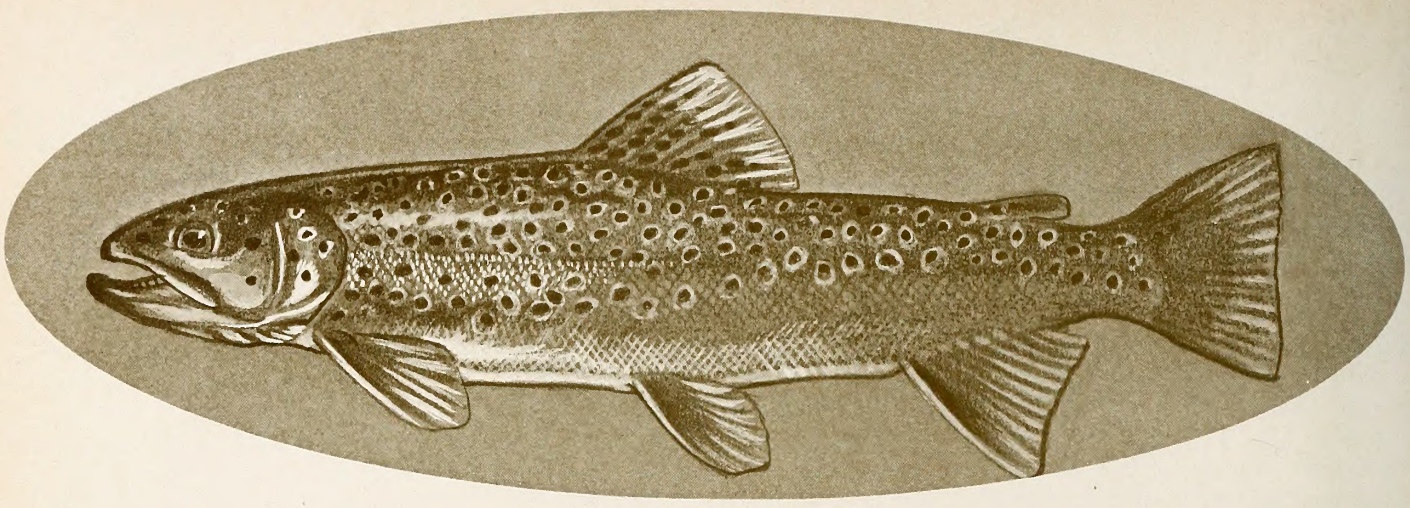
Contrary to popular belief, it is not the modern, adequately-powered runabout (of which there are countless configurations, etc.) that cause the fatal accident. To some of the non-boating public, any brightly colored power boat running the lake at 30 mph with a crew of fun seekers aboard is an accident on the way to happen. This is especially true if the boat throws a rooster tail. It is true that there are some tragic accidents in the records involving this type of craft and crew and there will continue to be. But the fatal accident by far involves the smaller, often manually powered boat.

How do they happen? What is involved? Many times investigating Wildlife officers can only speculate. A small boat is found capsized. A few days later, a body is found. In sheltered waters we can assume that standing, reaching or leaning to free a fishing line, changing seats, or hitting a submerged object are leading causes. In open water, flooding, followed by capsizing, trying to swim to shore, cold water, not wearing or having a life saving device immediately available are additional contributing factors.

My boating experiences have taught me this, if nothing more, most people find their boat is too small for the next adventure, seldom too large. Thus a consideration when buying or building. But, of course, the lightweight will always be a *highly* useful craft for outdoorsmen, be it back water fishing, drifting for ducks or whatever. However, not even an expert swimmer, on the hottest August days, wants to face the indignity of cooling off via capsizing. The point is, move about in those useful lightweights like you're walking on ice. And really let that common sense take hold when the weather looks rough. Better to cancel than to visit Davy Jones in his legendary locker.

Contrary to popular belief, this boat load of fun seekers is less likely to be involved in a fatal boating accident than the youngsters in the rowboat or the fisherman preparing to launch his light utility rig.





The Brown Trout

by J. H. Cornell
Chief, Division of Inland Fisheries

THIS import from Europe is claimed to be both the anathema and the salvation of our trout fishing. Just stop at the local store or gas station in a mountain village some evening when the "hot stove league" is in session. You will hear forceful statements to the effect that they are taking over all of our trout waters; that they turn into cannibals and eat up all of their smaller neighbors; that they are so difficult to catch that they do not provide any sport; and that the whole kit and kaboodle of them should be consigned to perdition. Equally violent replies will contend that they extend our trout fishing waters by living where the heat, silt, and pollution would kill our native trout; that they will grow large even in small streams; that they are much less migratory than some other species; and that they are extremely selective in their feeding and are hard to fool into taking a hook.

Like most arguments, there is a modicum of truth in all of the major contentions of both opponents and the proponents. The desirability of stocking brown trout in any particular stream should be determined by a realistic and unbiased consideration of all the factors involved.

The strikingly beautiful coloration of the brook and rainbow is not matched by the brown trout. Its body tends to be more chunky and heavy in proportion to its length. Its back is a brownish-black shading to silvery below. The upper parts are heavily marked with black spots extending onto the dorsal fin and tail. Some of these spots on the body may be ocellated. Mixed with and below the dark markings may be irregularly spaced red spots, more frequently with a pale border. The dorsal fin has ten to thirteen soft rays, and there are nine to twelve in the anal fin. The scales are larger than in most other species of trout, there being from 115 to 150 in the lateral line.

In different parts of our country, this fish may be called the German Brown trout, the Von Behr trout, or the Loch Leven trout. It is reported that the Von Behr trout, which were imported from Germany, characteristically had red spots with the black ones; but the Loch Leven trout, imported from Scotland, had no red spots. However, they were so closely related that they have been crossed, both in hatcheries and in the wild, until there is no longer any valid distinction between the two strains.

Habitat

When the polar cap receded at the conclusion of the third ice age, the waters warmed and became unsuitable for those species which required a constant cold-water habitat. The survivors of those species were the ones which found their way into high mountain streams where suitable temperatures continued to make life possible. In eastern United States the brook trout remained. West of the Rocky Mountains, the rainbow trout and its relatives survived. In northern Europe it was the brown trout. In England, Scotland, Norway, Germany, and Russia it was the same fish. Thousands of years of isolation under slightly different conditions produced minor aberrations, usually in color, which account for the so-called "strains" of the same species. And so it was with the brown trout from Germany and Scotland.

History has it that the first importation of brown trout was received by the New York State hatchery at Cold Spring Harbor, Long Island, N. Y. Mr. Fred Mather was in charge of the station. He attended the International Fisheries Exposition at Berlin in 1880, caught their native trout in the streams of the Black Forest, and was impressed. He arranged with Herr F. Von Behr, president of

the German Fisheries Society, to ship him some of the eggs. In February, 1883, the first shipment of brown trout eggs arrived in this country.

The first shipment of the Loch Leven strain arrived the next year. In 1884, Sir J. Ramsay Gibson Maitland of Sterling, Scotland, sent a shipment of eggs to the United States from the Howieton fishery. This strain was propagated in Montana and other western states, and even today the Loch Leven name persists there. The complete mixing of these two strains is the source of our brown trout.

In general, we find the brook trout in the very coldest headwater brooks and branches. The rainbows are a little farther downstream, where the water is warmer and the streams are larger. By preference, they will occupy the fast water of the rapids and the white foamy stretches of the chutes and falls. The habitat preference of the brown is for big water but without the rapids. They will compete with either the brooks or rainbows if necessary, but they do best in waters that run at a moderate pace through large pools in the meadow-like sections of stream.

The preferred temperature range of browns and rainbows is almost identical. They will begin active feeding as water temperatures increase to fifty degrees, but temperatures above sixty-eight make them unhappy and they are no longer hungry. Fishing produces little results, although both species can survive considerably higher temperatures when the water is well aerated. Unlike the rainbows, the browns seem to prefer the warmer limits of their optimum temperature range.

Life History

Like the brook trout, the brown trout spawn in the fall. Their spawning migration is not nearly so extensive as the other species, and those that live in the smaller streams may simply move up out of their pool of residence and spawn on the next riffle. The fish from the larger waters will move into the tributary streams in late summer, although they will not spawn until the water has cooled.

The nest is built by the female. With violent vibrations of her body and tail fin, she will excavate a hole several inches deep in the gravel of a riffle. The male will follow her about, apparently supervising the work, or he will occupy his time in driving away any smaller males that happen to be in the vicinity. When the nest is ready, the male and female move into it side by side and facing upstream. The eggs are laid and fertilized and they sink to the bottom of the depression. They are adhesive for a short time, and stick to the stones in the bottom of the nest. The female promptly covers them with gravel so that the nest is returned to the level of the stream bed. The filling is at least partly accomplished with gravel washed down by the current as she builds her second nest just above the first. She may build and lay eggs in several nests in the course of spawning, but they always are built successively straight upstream.

At a water temperature of forty-five degrees, the eggs will hatch in sixty-three days. Over a period of several weeks, the food supply in the attached yolk sac will be absorbed and the fry will be free to swim. They will work their way up between the stones of the gravel and begin their endless search for food. The very smallest aquatic life of the stream will suffice at first, but as soon as they are large enough they will begin to feed on both the immature and the adult aquatic insects. It is this inordinate fondness for May flies, caddis flies, and stone flies that endears the brown trout to the heart of the fisherman with his artificial imitation of their favorite foods.

Importance

Its extremely cautious and temperamental feeding habits make the brown more difficult to catch than any other trout. The brook will take flies that are good imitations of his natural food, but if they are poor imitations he does not seem to care. If they are as gaudy as a sport shirt and look like nothing that ever lived, he will try them anyway just to see if they are edible. The rainbow, in his fast-water habitat, has little time to inspect a lure as it passes him. Imitations do not have to be perfect. And in that fast water, the addition of a spinner seems to increase the chance for the characteristic vicious strike.

But the brown trout, in his lazy pool, is a different customer. He may likely move along with the slowly drifting dry fly and inspect it carefully. If it is a good imitation and well presented, it may be taken; but if not, it will be ignored. The wet fly, too, must be handled carefully. Any unnatural movement is enough to prevent a strike. At best, the strike will be a gentle tug which often may go unnoticed. It is no wonder that so many browns live to a ripe old age.

The very fact that they are hard to catch makes brown trout desirable in the most heavily fished streams. Most fishermen will not catch a lot of them; but some will be caught all through the season and provide sustained fishing. There will be brood stock left, even with heavy fishing pressure.

A large brown trout usually will establish its headquarters in one particular pool and will prowl around that particular area for food. If other fish attempt to move in, they will be eaten or driven away. The pool might be big enough to provide living room for a dozen smaller trout, and it would be good conservation to catch the big one. Some fisherman would be happy and there would be room for more trout in the stream. But, unfortunately, those big browns do most of their feeding from dusk to well after dark. During the daylight hours they remain in hiding and even refuse live bait.

One of their preferred foods is crayfish. Another is minnows—or smaller trout. The fisherman who is after a really big brown should be on the stream

• **continued on page 27**

What Does It Really Mean?

National Wildlife Week

by David C. Coxe

IT was 1938. J. N. "Ding" Darling, one of the founders of the National Wildlife Federation and a famous editorial cartoonist of the day, was broadcasting a 15-minute radio program called the "Save America Series". It was one of the key promotional items being used for the first annual observance of National Wildlife Restoration Week. Franklin D. Roosevelt was the Nation's president and we had a world war lurking just around the corner. Americans were beginning to grow concerned with the future of their wildlife heritage. Now they were organized.

Although 1941 brought with it a major crisis, it did not deter the efforts of concerned citizens. A radio committee for the promotion of Wildlife Week was formed. Names such as Fulton Lewis, Jr., and Lowell Thomas were not uncommon as serving members.

The idea grew and through the early years many special dinners, public meetings, and awards programs were held to help focus attention on pressing conservation topics of the day.

These first years also marked the initiation of the National Wildlife Federation's conservation stamps which have become a vital source of revenue for conservation projects.

Today's wildlife week messages are being brought to the attention of the public through every available means of the news media. Its thought-provoking materials are used in schools, homes, and business. The National Wildlife Week observance has become one of the most effective grass root celebrations in the country.

In the past each annual program was geared to a fresh approach which would capture the interest of the people. A different and timely topic was chosen each year. Such themes as water pollution, outdoor recreation, natural beauty, conservation education, and the need to improve natural areas for wildlife were chosen. Change was in the making.

The end of the sixties brought about a new awareness to the public scene. People began to think in terms of the total environment; not just isolated portions.

Over the years man had looked at wildlife through the eyes of the hunter, the fisherman, and the sentimentalist. Hunters and fishermen had spent millions of dollars annually to pursue their sports. They had also contributed greatly both in time and money to the preservation of the fish and game.

Man is now faced with the very real possibility of losing many forms of wildlife because of his indifference to what our wildlife really means to the total environmental picture. You see, man failed to understand that the presence or absence of wildlife is a key factor in the predigious issue of pollution controls.

It has been said that wildlife acts as a yardstick by which man can measure the quality of his own environment. This is made quite clear by the growing number of species on the National Wildlife Federation's endangered species list. Seventy-eight were listed in 1967; eighty-nine in 1969; and an alarming 102 thus far to date. Unless the current trend toward environmental pollution is reversed the list will increase an-

nually. Should this happen, the only endangered species man will have to contend with will be man. Pogo's sage remark certainly brings the truth home. "We have met the enemy, and he is us."

In this age of progress and increasing emphasis on economics, many persons ask this question, "Who needs wildlife?" They wonder why so much fuss is made over a few wild animals or birds or fish when there are so many other things in this world to consider.

Are we too busy trying to make a dollar to care what happens to our wildlife? Must our own needs come first, last and foremost? Should we be concerned with problems that may or may not have an effect on us a few years from now? What about the problems of right now?

Conservationists have fought for years to make America conscious of the plight she faced. For years they have seen their efforts pushed aside because "progress" was more important. They have always taken a back seat to the developers. It's the way our society has been oriented. Development and conservation should be a partnership rather than a war. Yet, many of those who currently ride the new wave of conservation popularity as well as those who have climbed on the political band wagon, turned deaf ears in the past. Finally something happened.

The apathetic majority began to speak out. Our "Who needs wildlife?" attitude reached its zenith. Americans began to answer loud and clear. "We do." The here-to-fore anti-conservation forces realized that they had as much to lose as the next fellow. Industry began to do something constructive in preventing further pollution of our air and water.

America is at the pinnacle of her own procrastination and must be willing to pay the price of her neglect. The cost is going to be heavy and some are not yet willing to meet it. To those who ask if it is too late to change, the answer still lies in man's own attitude toward his future.

Many ask what can a private citizen do. Others ask about group actions. Well, the answer is PLENTY. After all, we are the biggest polluter of all.

We drive automobiles which cause most of the air pollution. We use the foamy household detergents that cause most of the phosphate pollution of our waters. We throw away over 28 billion bottles and 48 billion cans a year which add to the growing garbage heaps around us. The first place to start is with us.

1. For short distances, walk or ride a bike. Better for your health, too.
2. If you commute, use car pools.
3. Use lead-free gas when possible. Keep your car properly tuned.
4. Use non-polluting detergents or go back to laundry soap.
5. Refuse to buy throw away cans or bottles where possible.
6. Cut down on the use of paper bags and wrapping paper.
7. Refuse to buy colored tissues. The dyes pollute the water.
8. Stop flushing garbage down sink disposal. It adds to the heavy organic load at the treatment plant.
9. Use less electricity. Turn off lights when not in use. Power plants are big polluters.
10. Discontinue burning leaves and trash. Start a mulch pile.
11. Do not use persistent pesticides such as DDT, Aldrin, Dieldrin, heptachlor, endrin, Lindane, Chlordane.
12. Do not flush waste oil down the sewer. Haul it to the garbage dump.
13. Do not overuse water.
14. Quit smoking.
15. Stop littering. See a litterbug, pick up his discard and give it back to him.
16. If you know a company that is polluting the air or water or land, write the company president and ask him what is he doing about it.
17. Stay informed. Write to your newspaper about any ecological issue on which you feel strongly. If you can't write, call.
18. Write, phone, or tell your views to your township supervisor, alderman, state representative or Congressman.
19. If you are a stockholder in a company, write the president and ask him what "our" company is doing about pollution.
20. Write or call your mayor and ask what level of sewage treatment the city has. If it's less than tertiary, your city is a big polluter.
21. If you are a farmer or a landowner, leave some unmowed fence rows or brush piles for the birds and animals.
22. If you are a hunter or fisherman, always bend over backwards to be courteous to farmers and observe their rights.
23. Support conservation groups and clean up campaigns.
24. Call your grade school or high school principal and ask him or her what the school is teaching on ecology and the environment. If nothing, why not?
25. Do not buy alligator purses or shoes, leopard skin coats, or other products made from skins or feathers of endangered species.

Finally, do not overlook the power of group action. It is a tool that has been successful since the dawn of man. You may not be able to do more than just stop buying throwaway bottles and cans, but collectively you can force the manufacturer to stop the manufacture of throwaway materials. Singly you are only one letter writer, but collectively you can overturn political mountains and force the issue to the point of getting something done — Now.

It still takes effort to get something accomplished in this life. Don't be guilty of doing nothing. The beauty that still surrounds is a gift. Shall we accept it and protect it or shall we destroy it? Yours is the choice.

For further information, please write David C. Coxe, 2916 Oberlin Road, Raleigh, N. C. 27608. ◆

Last Season

A wildlife protector stays on the job year after year because he likes it and believes in what he is doing. Much of the time it isn't an easy job.

By Cliff Turner
Outdoor Editor
Durham Morning Herald

THE morning sun twinkled through the trees, making a good back-drop for two young doe deer that skittered across the open rye field as they headed for thicker cover.

It was early Thanksgiving morning 1970. The Butner and John Umstead Hospital Wildlife areas were astir with hunting parties from across the state as they yawned, stretched and began crowding around the fire to warm chilled fingers and toes.

"I sure hope no one will bother those does today," said Marvin Ward, a Durham wildlife protector, as we drove down Goss Road, "but I don't think anyone will. Hunters have been pretty good this season about laying off the female kills."

The morning air was nippy with the early morning frost. Hunters stood in bunches swapping yarns about the big buck that got away the day before. Some young chap had a big piece of his shirt tail gashed. Evidently he had missed one of those he can tell about around the campfire later. He took the good-natured ribbing in stride.

"Yea," grinned 14-year-old Mark Wheeler of Greensboro, "if you hadn't hollered shoot when I was aiming, I might have stopped him."

"Hunters are a funny breed of people," Ward said as he began another day's sleuthing the field, checking game kills and hunting licenses. "We haven't found too many hunters this season that have been without a license. Most of them know the regulations pretty well and come prepared."

Down the road a short way is Tom Goss' place, a gathering for hunters that are looking for stray dogs, dressing out their kills or just standing around the open fire spinning a few tales. Inside Goss' hunting cabin, the wall is decorated with big racks —one belonging to Enos Slaughter, a former New York Yankee-St. Louis Cardinal baseball player. "Enos is a good hunter," Ward noted. "He should be out here somewhere today."

"Enos won't make it today," the weathered-looking Goss volunteered. "He's alookin' for company to eat turkey dinner with 'em."

Down at Copley's Corner, Walter Dunn had dropped a nice eight point buck that got the oohs and aahs from envious hunters that stopped to inspect the kill. That was early in the morning. About midday, Benny Bryant of Burlington topped that with a nine-point buck bagged on the West Range Road. "That was the one I saw early this morning," grinned Wildlife Patrolman Sterling Baker, a former high school star quarterback at Fayetteville High School. "Yea," laughed one of Bryant's hunting mates, "ole Benny was in the right place at the right time. How lucky can you get?"

Ward stopped to make periodic checks along Goss Road, Mangum Store, Moriah Road and Cassen Tilley Road. Everything was shipshape.

While the icy November morning forced a lot of the hunters to wait until the sun got a little higher, Jessie Marks of Henderson wasn't about to let the young whippersnappers outdo him. His hunting license had his birthdate marked July 1895. "That makes me 75 years old," he beamed with a look of proud-

In most hunting areas there's a gathering place at the crossroads where you can relax during midday, and maybe swap a yarn or two . . . without fear of going over the limit!

PHOTO BY TOM ROLLINS

ness. "I haven't seen a single deer this morning. But I'm gonna stay until one comes my way." He rubbed his chilled hands together and retreated to a spot on the ditch bank where the sun had already spread its warm rays. "I ain't goin' nowhere until I at least see one."

Ward, who contends that young and old alike love to hunt, gave the old man a word of encouragement and headed back to the warmth of his car. "If anyone gets a kill today, I hope it's him," Ward commented as he wheeled his patrol car down the road.

Ward not only enforces strict rules in his job as a wildlife protector, but he's handy with a pair of scissors when it comes to a tailoring job. He trimmed up several red vests for hunters to don from a bolt of bright scarlet cloth in the trunk of his car.

"Hunters are urged to wear something bright so they can be seen. This makes it safer for everyone," he said ripping off a 12-inch piece of material. "We also try to encourage safety rules, too," he added. "We haven't had any serious accidents out here this season. We hope it stays that way. I think a lot of the hunters are more safety conscious than they have been in the past."

Ward has been at his job 21 years. His protector's badge is beginning to show a little tarnish. "It's an interesting job being in the outdoors and mingling with the hunters. You get to meet a lot of people. Some you'll never forget."

Friendship, however, doesn't stop Ward from enforcing rules and regulations that he took a sworn oath to uphold. "Sure I've given some of my best friends a citation. They're usually cooperative and if you show them they're wrong, they understand.

"Some of the hunters aren't aware they need the game land permit in addition to the state and big game license. They think they're ready until you stop to check. We try to be considerate. None of the protectors tries to give anyone a hard time, but it is a necessity that hunters purchase all the required licenses.

"Sometimes we meet a hard case. But we're trained to deal with them just as we are in being friendly with everyone," Ward pointed out. Only two citations were written that day. Both hunters had failed to obtain the game land license.

Durham's three protectors, Ward, Baker and Tyson Laney patrol the area in and around the John Umstead Hospital area. Sometimes they work into the wee hours of the morning. Thursday, was indeed, a busy day.

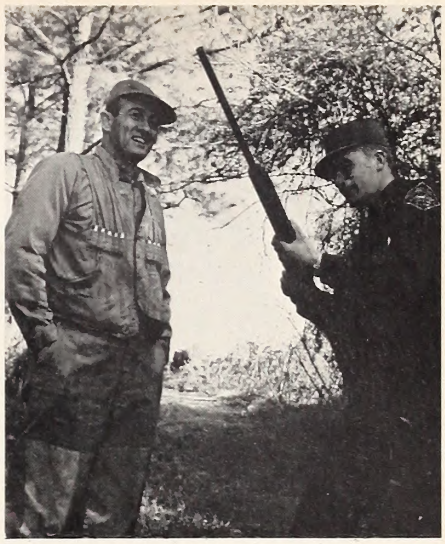
"We may be lucky to get home by midnight," Ward said. "I got home Wednesday night about 9:30, but we may have to stay longer and check some of the hunters when they come out of the fields."

The veteran protector's day begins at 5 a.m. But some nights may get longer than others. Poachers, who illegally hunt with powerful lights, are sometimes found cavorting around the area in search for deer that herd in a field to feed. "We've had a few cases of that, but not too many," Ward was happy to report.

Tom Atwater, an old veteran turkey and fox hunter, stopped Ward to show him where a hunter had made an illegal kill of a doe. "It makes me hot for someone to do that," Atwater fussed while stuffing his chilled hands into the pockets of his big overalls. "Some hunters don't use any common sense."

After locating the deer, which was about 35 yards off the road, Ward and Atwater retrieved the animal. "We take most of the doe kills and give them to the prison farms," Ward said as he got a helping hand in loading the carcass in the trunk of his car. "But I think this one has been dead too long."

The Umstead Wildlife Area is patrolled frequently and thoroughly by the three Durham protectors. Hardly an inch of every road, corner and crevice goes untouched. It's part of being a wildlife protector.



It's the sworn duty of the wildlife protector to enforce the wildlife laws and regulations; you can help by reporting violations and illegal kills.

So on into the wee hours of the morning Ward, Baker and Laney will go about their job. It means long and tiring dedicated hours. That's all part of the job.

Tomorrow morning will be another day that will find the hunters flocking to the woods and fields trying to bag the trophy they can talk about in time to come.

Marvin Ward, Sterling Baker and Tyson Laney are all a part of it. They share in the thrill of a hunter's legal kill. Their job is to see that the North Carolina laws and regulations are enforced to the strictest point, however.

It's 5 a.m. and it all begins again like a continuous cycle.

Yes, hunters are definitely a different breed of people . . . ▲▼

Wildlife Management On Camp Lejeune

By Gene G. Stout

Conservation Division, U. S. Marine Corps Base, Camp Lejeune

PHOTOS BY CHARLES PETERSON

Many of the wildlife management practices carried out on the Marine Corps Base at Camp Lejeune are adaptable to private lands throughout North Carolina. This wild turkey has benefited from the sound program described here.

IN June 1969, the Secretary of Defense Conservation Award was presented to Marine Corps Base, Camp Lejeune, North Carolina. The award is bestowed annually on the armed forces installation which has organized the best program for conservation of natural resources. The program must be designed to ensure multiple use of military property and be consistent with military objectives of the installation. In 1969, 241 military conservation programs were examined prior to awarding Camp Lejeune the honor. The final judging committee consisted of representatives of the U. S. Department of Agriculture, Wildlife Management Institute, Natural Resources Council of America, Virginia Commission of Game and Inland Fisheries, and International Association of Game, Fish and Conservation Commissioners.

Also in 1969, Camp Lejeune's wildlife technician, Charles D. Peterson, received the Eastern Area Wildlife Conservation Award at the Governor's Achievement Banquet of the North Carolina Wildlife Federation for his contribution to the big game management program in eastern North Carolina. Both awards are indicative of the quality of wildlife management at Camp Lejeune. Although this article presents no new management techniques, it not only describes an excellent management program, but also is concerned with management on a military installation which has certain aspects difficult to find duplicated on other types of management units.

I am indebted to C. D. Peterson; Sgt. F. W. Wright, Base Assistant Game Warden; C. F. Russell, Director, Base Conservation Division; and T. G. Cooper, Base Forester, for their assistance in researching Camp Lejeune's conservation program.

Area Description

The base is located on the Atlantic seaboard approximately 50 miles north of Wilmington, North Carolina. Irregular in shape, it extends some 15 miles from the Atlantic coast to the city of Jacksonville. New River, some 3 miles wide in places, divides the base into two unequal parts with about two-thirds of the land area lying east of the river.

The reservation contains approximately 110,000 acres of which 25,000 acres are swamp or water. Twelve of the 68 mile perimeter are ocean frontage paralleled by the intracoastal waterway. Housing, other buildings, and firing ranges utilize about 15,000 acres leaving 95,000 acres for fish and wildlife management. The normal peacetime military strength is about 35,000.

Surface relief ranges from flat (marsh areas immediately adjacent tidal creeks) to slightly rolling (highest elevation-70 feet above sea level). Deep wooded forests are found on the better upland range with many inaccessible swamps and pocosins in the bottomlands. The soil type of this coastal plain country generally is classified as sandy loam.

The climate ranges from long hot summers to mild winters. Mean annual precipitation is approximately 47 inches with no month averaging less than 2 inches. The growing season is approximately 230 days. Vegetation on the reservation ranges from mixed and relatively pure stands of hardwoods and conifers to extensive acreage of salt water and fresh water marshes.

Coordination and Cooperation

In 1963 Camp Lejeune officials executed a cooperative plan with the Department of the Interior

(Bureau of Sport Fisheries and Wildlife, U. S. Fish and Wildlife Service) and the State of North Carolina (Wildlife Resources Commission) for the conservation and development of fish and wildlife resources. In 1969, this cooperative plan was revised and updated. Representatives of these agencies periodically visit the base and have been of considerable assistance in formulating and executing the base's Wildlife Management Plan which is updated annually.

Cooperation also is maintained with the Soil Conservation Service, U. S. Department of Agriculture, which conducted a soil suitability survey of the woodlands on the base. In this survey, soils were rated as to their game potential and fisheries possibilities. The survey is useful in establishing vegetative cover programs and improved drainage as they relate to requirements for improved fish and wildlife programs.

Wildlife management program

Food Plots

At present there are 63 sites totalling approximately 250 acres cleared for food plots. These plots are located in all sections of the reservation. Depending on time availability and budget considerations, a varying number of these plots are planted with summer annuals (millet, milo, soybeans, buckwheat, and cowpeas) in late spring. These are utilized by most wildlife species although bobwhite quail, turkeys and cottontails probably make the most use of them.

Approximately 50 of the food plots are planted to winter annual mixtures of rye, wheat and oats in early fall. The remaining plots are left fallow. These fall plantings provide succulent green and dry grazing during the winter months. Deer, turkeys, bobwhite quail and cottontails heavily utilize these plantings. Plantings are not plowed under until the following year's seedbeds are prepared allowing these areas to be used for nesting after their food supply is depleted. Many of the food plots have sections planted in perennials such as lespedeza, partridge pea, and beggar-lice which are used by small game for both food and cover.

Small Game Strips

Prior to 1970, 15 quarter-acre strips, located in various sections of the base, were planted each spring in mixtures consisting of annuals for food and browntop lespedeza for cover. These strips were utilized by the same species that make use of the spring food plot plantings.

In late winter 1970, 55 additional quarter-acre strips were cleared and will be planted in an annual seed mixture in May of each year. Some of these strips also will have a portion planted in perennial shrubs for cover and food purposes. These strips, established as a beginning of an intensive quail management program, are located in a predominantly conifer area of approximately 5 square miles. Parts of the area had reasonably good quail populations prior to clearing, but with the addition of these strips, the quail population should increase sufficiently to provide excellent hunting. These strips also will benefit other wildlife, especially turkeys. If this intensive small game strip establishment is sufficiently successful (in terms of increased game populations and hunter success), the program wil be extended to other parts of the base.

The preparation and planting of food plots involved some 250 acres through the 1970 season. These were located in areas that lacked natural wild foods.

Plantings for Dove

Prior to 1969, dove management had not been emphasized on the base. Small grain plantings of proso millet and wheat for mourning doves were established in spring 1969 on 5 sites of 5 acres each. In most cases these 5-acre plantings were located in larger openings of at least 15 acres providing the large clearings that doves prefer. The reported 1969 kill (316) was well below desired levels, but the taking of most of these from two of the plantings made for doves is evidence that these plantings are a step towards good dove harvest management. A possible reason for the poor 1969 harvest is the lack of publicity concerning the plantings and resulting poor dove hunter turnout. With continued emphasis on the planting program for doves, the dove harvest is expected to increase appreciably.

Experimental Woody Stock Plantings

In March 1969 and February 1970, experimental plantings of several woody species were made on the base to evaluate their adaptability to the area's climate and soils and their potential as wildlife food. These plantings are part of a cooperative agreement between the Soil Conservation Service, which supplied the plants, and Camp Lejeune. In 1969, runner oak, Florida chinquapin, yellow crabapple, bush honeysuckle and autumn olive were planted and maintained. In 1970, plantings were made of runner oak, trailing chinquapin, Allegheny chinquapin and autumn olive.

In March 1970, the 1969 plantings were evaluated as to their condition and first year survival percentages. It is too soon to determine the value of these plantings as wildlife food, but many had good first year survival percentages. Future plans call for additional plantings under varying soil and shade conditions on the base. Some plantings will be subjected to burning and mowing to determine recovery rates. Base wildlife officials are interested in the value of these plantings as wildlife food since Camp Lejeune has large acreages of relatively pure pine stands where plantings of a variety of woody species could provide the necessary additional food for increased wildlife populations.

Wildlife Openings

Recognizing the need for woodland openings and their related "edge effect", natural openings are maintained, and additional openings (approximately 1 acre each) have been cleared on the base. Maintenance of these openings is effected with the use of rotary mowers at 3-year intervals to prevent woody succession. These openings are utilized by wildlife for feeding and nesting purposes.

Green-Tree Duck Impoundment

In 1968, a green-tree duck impoundment was constructed in a remote woodland section of the base primarily for enhancement of wood duck habitat. Annual management consists of fall flooding and a spring drawdown. When flooded, the impoundment covers approximately 10 acres. Twelve duck boxes with predator guards were placed in the impoundment, and 13 others were placed in various fresh water ponds and streams on the base. Since green-tree impoundments are relatively inexpensive and require little maintenance, two additional ones are to be constructed in the next several years.

Salt water habitat is considered sufficient for present wintering duck populations, and aside from the green-tree impoundment and duck nesting box construction, waterfowl management is not emphasized at Lejeune. Base wildlife personnel cooperate with federal and state agencies in the duck banding program.

Hunting Regulations and Wildlife Data Collection

Perhaps the best management tool available is the regulation of season dates, bag limits, and the manner of taking game. By proper use of hunting regulations, limited species can be protected, and abundant species can be properly harvested.

Due to housing, other buildings, and firing ranges, approximately 15,000 acres of the base are permanently closed to hunting. Approximately 10,000 additional acres, located close to housing, are only open to bow hunters and special organized deer hunts which are closely supervised. The remaining land acreage is divided into 44 hunting areas. Military training requirements determine which of these areas are open to hunting on any given day. Generally, few areas are open during the week although most of the base usually is open to weekend hunting.

Camp Lejeune is open to civilians as well as military personnel for hunting and fishing. Hunters are required to possess a valid county or state license before they can purchase a base permit. Hunters are required to obtain area passes at the game warden's office prior to each day's hunting. They must return their passes within one hour after sunset and at the same time have their game inspected and recorded.

The physical reporting of all game killed enables

Twenty-five wood duck nesting boxes were placed in the "greentree" duck impoundment and other fresh water ponds and streams on the base. Each was fitted with a predator guard as shown.

wildlife personnel to obtain information concerning various wildlife parameters. 1969 deer harvest data were used to compile information concerning population age structure from tooth eruption and wear and body size parameters.

There are two types of deer hunting on the base, individual and organized. As with all hunting at Lejeune, only shotguns are permitted. Although some hunters prefer slugs, buckshot is the most common ammunition. In recent years the limit has been set at two deer per season.

On weekends and holidays there are organized deer hunts under the supervision of selected volunteer huntmasters who are also deputy game wardens. The majority of deer killed are by organized hunters since they are authorized to use dogs. Huntmasters are assigned areas to hunt, and these areas are closed to individual hunters for safety purposes. Organized hunts are an excellent method to harvest deer in areas close to housing where individual hunters are not permitted, swampy lowlands where many hunters do not prefer to hunt, and areas that are considered overpopulated.

For the past 10 years antlerless deer have been hunted on alternate years, but starting with the 1970-71 season, they will be hunted each year on the base. Most of the base has a good deer population, but even with organized hunts, there are a few areas that are overpopulated. Antlerless deer hunts will be used to control the deer herd in these areas whenever feasible. The antlerless deer harvest each season will equal the previous season's antlered deer harvest. In this way the antlerless deer harvest will be self-regulating. If the deer herd size changes (as indicated by a decrease or increase in the antlered deer kill), the following year's antlerless deer harvest automatically will be adjusted accordingly.

Lejeune's use of organized hunts permits control of the antlerless deer harvest. Near the end of each antlered deer season, antlerless permits will be issued to individual hunters for areas where herd size reduction is desired. After the individual hunt, organized hunts will be authorized with instructions to kill only the remainder of the season's quota.

A civilian guest tries his hand at calling up a wild turkey during a spring hunt. Only male birds are legal, and the kill is closely tabulated.

Camp Lejeune has perhaps the best turkey population of any area its size in North Carolina. For the past 10 years, the base has been cooperating with the North Carolina Wildlife Resources Commission by permitting the trapping of turkeys on the base for transplanting to areas being restocked in western North Carolina. The base maintains its turkey population through the use of a spring bearded turkey hunt.. Turkey range at Lejeune is good, but it is not considered feasible to permit either-sex hunts at the present time.

Lejeune has good squirrel range, and its hardwood stands are exceptionally good for squirrel hunting. The cottontail population is below desired levels, and cottontail hunting must be considered poor. The base has good swamp rabbit populations in some of the bottomland regions, but these are not hunted extensively. The quail population is good although hunting is difficult in some areas due to thick cover.

Due to the length of Camp Lejeune's deer season (12 weeks in 1969-70), there is considerable overlap between the deer season and the small game seasons. Generally, squirrels are the only small game intensively hunted during deer season, and even squirrel hunters often are more interested in deer than in squirrels. Quail hunting comes into importance only after January 1 when deer and squirrels are out of season. Small game is definitely underhunted during much of the season.

The base has little control over waterfowl hunting because most hunters prefer to hunt from water acreage where base permits are not required. Waterfowl killed by land hunters are reported to the base game warden, but since these are only a small percentage of the total kill, the reported harvest data have little management value.

Predator Control

Camp Lejeune maintains excellent populations of gray fox, raccoon, and oppossum and good populations of skunk and bobcat. Since these natural predators are prey density-dependent, their relatively high numbers are considered indicative of expanding wildlife populations rather than a threat to wildlife. Except in localized situations, predator control is not specified for these species.

There is a large population of feral dogs on the base. These dogs often run in packs, and in at least one instance have intimidated hunters. This large population is probably due to excessive annual population recruitment by unrecovered organized hunt dogs. In January and February of each year steel traps are set in areas with plentiful dog sign in an attempt to control these dogs. A few dogs (four in 1970) and other predators are caught, but steel traps are, at best, a poor dog control technique.

One possible solution to the large number of stray dogs is to persuade dog handlers to use smaller numbers of valuable trained dogs rather than large numbers of untrained dogs as is the present practice. Trained dogs would be less likely to stray, and their value would be an incentive for handlers to spend more time searching for strays.

The Forestry Branch of the Base Conservation Division works in close conjunction with the Fish and Wildlife Branch. Forest management at Lejeune is directed towards ensuring a continuing supply of harvestable timber and pulpwood while implementing the multiple use concept on acreage being managed. The forest management program is not only professionally sound, but also incorporates wildlife management principles in its various aspects.

Although a few sections of the base have extensive hardware acreage, most of the upland reservation is largely pine forest. Small stands of hardwoods up to 5 acres are maintained for optimum mast production within larger areas managed primarily for pine production. An effort is made to ensure that a small percentage of hardwoods is maintained in all pine stands. Selective cutting of pines permits the growth of forbs and grasses which are utilized by wildlife. An additional benefit of the cutting program is the construction of access roads which not only provide hunter access, but also act as wildlife clearings with "edge effect" benefits.

Prescribed or controlled burning is carried out over 7,000 to 9,000 acres annually from December to March. Sections of the base are burned on a 5-year cycle. The purpose of this burning is to reduce roughage, thereby reducing fire hazards in critical weather. An important side benefit of prescribed burning is the improvement of wildlife habitat by increasing the growth of forbs and grasses. Since burned areas contain little food and cover immediately following burning, adjacent forest management units are not burned the same years.

Reforestation and natural regeneration are employed at Camp Lejeune to promote new timber growth. Reforestation involves either the broadcasting of pine seed or the planting of pine seedlings over large acreages of cleared and plowed land. Beginning in 1970, quarter-acre strips will be left unplanted in these reforested areas. These strips will be managed as small game strips and should prove beneficial in promoting wildlife in pine stands.

Natural regeneration involves clear-cutting an area leaving only scattered seed trees standing. Site preparation is completed using a tractor and heavy disk. If the remaining mature seed trees are sufficient to regenerate the area, the technique is an inexpensive method of promoting new timber growth. At Lejeune, instead of leaving only mature pines for regeneration, mature hardwoods also are left permitting regeneration of both pines and hardwoods resulting in mixed stands instead of pure pine stands. Eventually, practices such as this may eliminate the large pure pine acreages on the base, and thus reduce the need for wildlife food plantings.

Managing wildlife on a military reservation has both disadvantages and advantages. Reservations such as Camp Lejeune have large areas of unmanageable land due to firing range impact areas where unexploded munitions present hazards. Areas such as these are necessarily off-limits to wildlife personnel. At Lejeune, troop movements, which are difficult to predict in advance, often account for delays and setbacks in both wildlife and forest management. Troop movements have been disruptive to the North Carolina Wildlife Resources Commission's turkey baiting and capturing program, and troop activity is possibly detrimental to attainment of a higher turkey population on the base. Tracked vehicles often damage roads and thus cause access difficulties for wildlife personnel and hunters. Vehicles also have damaged food plantings although the plots are clearly designated by signs.

Conversely, wildlife management on mililtary reservations has certain advantages over management on public lands. Many military installations are isolated by barriers and gates. It is possible to limit access to such bases, and more important to obtain information concerning hunter use and game harvest from each hunter. Since military installations are federally controlled, it is possible to regulate hunting specifically for game management on the installation so long as regulatory authority does not exceed state and federal regulations. Military personnel can be used advantageously in wildlife management programs. Not only are wildlife managers and biologists serving in the armed forces, but military specialists such as surveyors, cartographers, demolition experts, engineers, heavy equipment operators, laboratory technicians, photographers and artists often are available. Much of the field work at Camp Lejeune is done by Project Transition personnel who request assignment to the wildlife section for 1 to 6 months prior to leaving the service to obtain practical experience that may be beneficial in civilian life.

The Department of Defense recognizes the need for effective conservation programs at military installations, and the presentation of the annual Secretary of Defense Conservation Award is evidence of this recognition. The quality of wildlife management at a military installation is a reflection of the base's conservation policy and the desire of command personnel to execute it. To have an effective wildlife management program, the command of a base must be willing to seek professional advice, cooperate with professional wildlife agencies, and formulate and carry out a well-balanced conservation program. Camp Lejeune is such a base. ◆

Sportsmen and Ecology

These days it's pretty darn hard to pick up a newspaper, thumb through a magazine, listen to the radio, watch television or look at the world around us without being reminded of the problems of environmental pollution. For those to whom it wasn't already obvious, the new ecology movement has done an excellent job of creating an awareness among the general public of the degree to which we have damaged, and are continuing to harm, our land, air and waters. Even more important, it is having some real success in forcing polluters to take remedial measures to reverse the present trend.

To sportsmen and the various private and governmental agencies who have long been concerned with conservation and sound management of open spaces, fish and wildlife resources, these new recruits to the cause are welcome allies. Hunters and fishermen have been fighting for clean air and water for generations. Their concern stems from the fact that the time they spend in the out-of-doors has made them far more aware of the problems than most of their fellow citizens.

Sportsmen are becoming concerned, however, at the degree to which the new environmentalists are assuming a protectionist rather than a sound-use concept about fish and wildlife. In their zeal for maintaining the ecological balance, many of them have taken the position that any killing of fish and game is an evil practice and should be condemned.

While this "reverence for life" philosophy is ideologically understandable . . . at least by the pure theoretician . . . it is biological nonsense. As any game biologist could explain to them, wildlife cannot be stockpiled. The determining factor in the life span of most species is the carrying capacity of the land on which they live.

Aside from migratory species such as waterfowl, most upland game birds and animals spend their entire lives in fairly small areas of land ranging from a few acres to a few square miles.

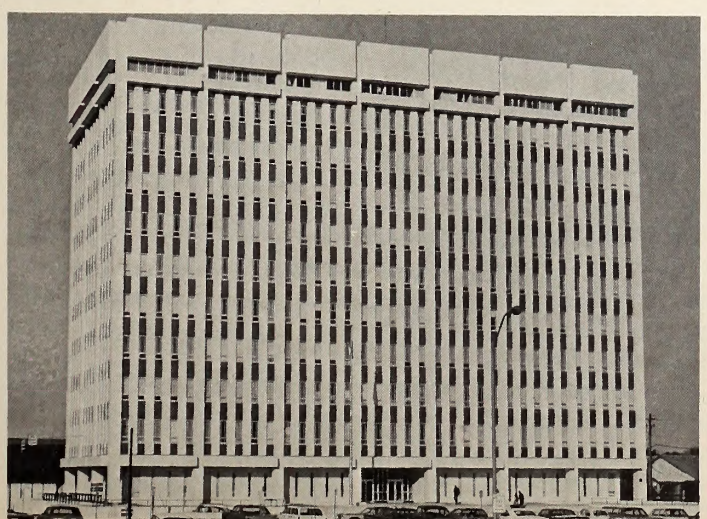
Even big game animals are confined to relatively restricted areas. The number of wildlife a given area can support relates directly to the kind of natural cover and food available. Once the carrying capacity of the range has been saturated, disease, starvation and predation take over to apply natural controls, reducing the populations to what the area can support.

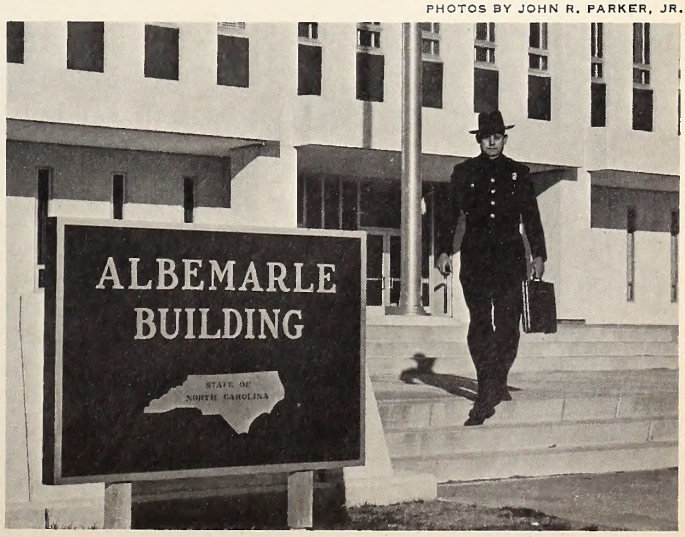
That these natural methods are often cruel hardly needs to be reported to a sportsman or game management expert who has seen the results. Thus, these people understand that hunting is a far more humane method of control. Hunting regulations, which are promulgated by fish and game personnel, are really designed to harvest some of the surplus that is otherwise destined to die of starvation or predation.

New Location

The Wildlife Resources Commission has moved into new quarters. The Albemarle Building is located on the corner of West Lane and Salisbury Streets, and the Commission occupies the fourth floor and half of the third.

PHOTOS BY JOHN R. PARKER, JR.





KNOW YOUR PROTECTOR

Robert M. Tatum

Wildlife Protector Robert M. Tatum, was born May 23, 1947 in Sanford, N. C. Protector Tatum is the son of Mr. and Mrs. W. R. Tatum of Sanford.

Robert graduated from Sanford Central High School and finished two years at Sandhill Community College. He also has completed the three weeks Basic Recruit School and the Basic In Service School for Wildlife Protectors at the Institute of Government at Chapel Hill. Robert, or "Bobby", was employed as a Wildlife Protector Trainee January 19, 1969 and was stationed in Richmond Co. He stayed in that position until May 1, 1969 when he was called into active duty with the National Guard. Upon his return he was employed as a Wildlife Protector and stationed in Charlotte, Mecklenburg County.

Robert is married to the former Elaine Perry of Sanford, they have one son, Robert M. Tatum, Jr. The Tatums are members of the First Presbyterian Church of Sanford.

DIVISION ENFORCEMENT RECORD FOR JANUARY, 1971

HUNTING & FISHING

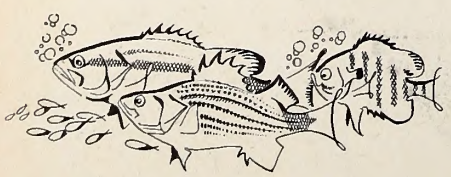
Persons checked	20,898
Total prosecutions	868
Total convictions	808
Total cases not guilty	17
Total cases nol prossed	42
Total cases dismissed	1
Total fines collected	$11,261.00
Total costs collected	$10,369.55

BOATING

Persons checked	455
Total prosecutions	47
Total convictions	45
Total cases not guilty	0
Total cases nol prossed	2
Total cases dismissed	0
Total fines collected	$ 60.00
Total costs collected	$ 603.00

All fines and any arrest or witness fees are paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the North Carolina Wildlife Resources Commission or its personnel.

It's hardly news that man is the greatest predator of all the species. His whole history has been one of trying to tame nature, and hunting has always been a part of this struggle. Now that we have become acutely aware that we have mastered our environment to the point where we are ruining it, it's important to remember that in spite of the apparent contradiction, hunting under proper controls is really a constructive and not destructive activity. It is also vital for the new environmentalists to recognize that sportsmen, who for generations have devoted time, effort and money to fighting pollution, preventing or slowing down the destruction of open spaces, and developing programs for sound wildlife management, are their strongest allies. The two groups should work together, not at cross-purposes . . . New Hampshire Fish and Game Dept. Newsletter. ⬍



Good News For Outdoorsmen

A brand new publication for fishermen, hunters and all outdoor enthusiasts of North Carolina will be available in March.

"Freshwater Fishing and Hunting in North Carolina," published by the Alexandria Drafting Company, Alexandria, Virginia, will make its debut at the Charlotte Sports Show this month.

The book is designed primarily to interest the fishermen and hunters in the state, but will also include detailed information on a wide range of other outdoor pursuits. Golf, camping, hiking, snow skiing, gem hunting, boating and horseback riding are covered, plus other outdoor sports.

Best of all are the maps. There are 38 excellent, full color map pages (13 inches by 20 inches) and a base map of North Carolina with a scale of one inch to each four miles. The maps cover lakes, streams, wildlife management areas, parks, National Forests, and other areas of interest to sportsmen.

A comprehensive text and countless photographs cover fishing and hunting plus many of the other major outdoor sports in the state, telling what's available and how, when and where to find it.

A centerfold with paintings of all of the major North Carolina fresh water fish in full color is included. An elaborate Citation and Awards program for trophy fish is introduced in the volume, and anglers who catch lunkers can enter their fish and receive a Citation or cloth shoulder patch award depending upon the size of the catch.

In addition, there is detailed information on many other subjects, including accommodations, marinas and other facilities serving the outdoor public.

Copies of this big, colorful volume will be available on many newstands and at some tackle shops following the Charlotte Sports Show, or they may be ordered at $5.38 per copy (including tax and postage) from the Alexandria Drafting Company, 417 E. Clifford Avenue, Alexandria, Virginia 22305.

A companion volume on salt water is promised for release in April. ⬍

GAME LAND	STREAM (INCLUDING UNLISTED TRIBUTARIES)	SECTION	MILES	COUNTY	REGULATION	FISHING DAYS
	Davidson River	Above Avery Creek	12	Transylvania	Native	Sat.-Sun.-Wed.
	Avery Creek	Entire	5	Transylvania	General	Daily
	Looking Glass Creek	Entire	6	Transylvania	General	Daily
	North Mills River	Downstream from Hendersonville water supply dam	4	Henderson	Native	Daily
	Bent Creek	Entire	6	Buncombe	General	Daily
	North Fork French Broad	Entire	20	Transylvania	General	Sat.-Sun.-Wed.
	South Mills River	Headwater to Wolf Ford	6	Transylvania	Native	Sat.-Sun.-Wed.
SGAH	South Mills River	Wolf Ford to Turkey Pen	8	Henderson & Transylvania	Trophy	Daily
	South Mills River	Turkey Pen to Lower Boundary	4	Henderson	Native	Sat.-Sun.-Wed.
	Grogan Creek	On refuge(above Henderson water supply intake)	3	Transylvania	Closed to fishing	
	Bradley Creek	On refuge(above Henderson water supply intake)	15	Henderson	Closed to fishing	
	North Mills River	On refuge(above Henderson water supply intake)	8	Henderson	Closed to fishing	
	Big Creek	Entire	2	Madison	General	Sat.-Sun.-Wed.
CH LAUREL	Hickey Fork	Entire	3.5	Madison	General	Sat.-Sun.-Wed.
	Big Santeetlah Creek	Entire	13	Graham	General 4/	Sat.-Sun.-Wed.
	Little Santeetlah Creek	Entire	5	Graham	General 4/	Sat.-Sun.-Wed.
NTEETLAH	Deep Creek	Entire	6	Graham	General 4/	Sat.-Sun.-Wed.
	Bear Creek	Entire	5	Graham	General 4/	Sat.-Sun.-Wed.
	Slick Rock Creek	Upstream from Tennessee State Line	8	Graham	Native	Sat.-Sun.-Wed.
	Big East Fork Pigeon River	Entire	10	Haywood	General	Sat.-Sun.-Wed.
	Left Prong West Fork Pigeon River	Entire	8	Haywood	General	Sat.-Sun.-Wed.
ERWOOD	Middle Prong West Fork Pigeon River	Entire	5	Haywood	General 5/	Sat.-Sun.-Wed.
	Right Prong West Fork Pigeon River	Entire	3	Haywood	General	Sat.-Sun.-Wed.
	Little East Fork	Entire	5	Haywood	General	Sat.-Sun.-Wed.

GAME LAND	STREAM (INCLUDING UNLISTED TRIBUTARIES)	SECTION	MILES	COUNTY	REGULATION	FISHING DAYS
SOUTH MOUNTAINS	Jacob Fork	Entire	5	Burke	General	Sat.-Sun.-We
	White Oak Creek	Entire	5	Burke	General	Sat.-Sun.-We
	Shinny Mountain Creek	Entire	4	Burke	General	Sat.-Sun.-We
	Henry River	On refuge (above Morganton water supply intake)	7	Burke	Closed to fishing	
	He Creek	On refuge (above Morganton water supply intake)	1	Burke	Closed to fishing	
STANDING INDIAN	Nantahala River	Above high concrete bridge	10	Macon	General	Sat.-Sun.-We
	Nantahala River	Below high concrete bridge	2	Macon	Trophy	Daily
	Kimsey Creek	Entire	4	Macon	General	Daily
	Park Creek	Entire	3	Macon	General	Sat.-Sun.-We
	Long Creek	Entire	2	Macon	General	Sat.-Sun.-We
THURMOND CHATHAM	Dungeon Creek	Entire	2	Wilkes	General	Sat.-Sun.-We
	Joshua Creek	Entire	4	Wilkes	General	Sat.-Sun.-We
	Pike Creek	Entire	4	Wilkes	General	Sat.-Sun.-We
TOXAWAY	Toxaway River	Entire	12	Transylvania	Native	Sat.-Sun.-We
	Horsepasture River	Entire	6	Transylvania	Native	Sat.-Sun.-We
	Thompson Creek	Entire	4	Transylvania	Native	Sat.-Sun.-We
WAYAH	Wayah Creek	Entire	6	Macon	General	Sat.-Sun.-We

1/ **Trout Season** - One-half hour before sunrise on April 3, 1971 to one-half hour after sunset September 6, 1971.

2/ **Extended Season** - From Labor Day through October 31, 1971 on Wednesday, Saturday, and Sunday on all Game Lands During this extended period, trophy trout regulations will be in effect and only single hook artificial lures are permitted, and on trophy trout streams only artificial flies are permitted.

3/ **Research Streams** - Anglers fishing these, in addition to all other license requirements, must obtain a free one day special use permit at the Fox Camp Check Station prior to fishing, and must submit his creel for inspection at the check station immediately following conclusion of his fishing.

4/ The use of fish as bait is prohibited.

5/ The use of bait other than artificial lures is prohibited.

NOTE: For further details see "1971 North Carolina Fishing Regulations."

"Catches more fish, too."

BROWN TROUT

• continued from page 15

at dusk or at dawn with a big bait or with a bass-like streamer or bucktail. Some few fishermen catch them consistently, but it takes a smart and experienced angler to do it.

The brown trout has an important place in fish management today. The brook trout is restricted by temperature preference to the cold headwaters and should be protected from brown trout competition. In some streams, browns and rainbows can be mixed successfully and the different habitat types will separate them. But in the typical rushing mountain stream, rainbows should be stocked and browns excluded.

The place for the browns is in the big streams of the foothills which are too warm for the brooks and too slow for the rainbows. They always should be stocked below barriers such as falls, either natural or man-made, if the preservation of the upstream species is a consideration. By such stocking, the total amount of our trout water is considerably extended.

A warming climate, a falling water table, and continued logging are slowly destroying our brook trout habitat. Siltation and pollution from erosion, grazing, and mountain farming are reducing the miles of stream available to the rainbows. Because the brown trout can stand more unfavorable conditions than either of the other species, they are important in our trout fishery today. In the foreseeable future, as stream conditions continue to become worse, the brown trout will constitute the basis of whatever trout fishing we may have.

The Work of the N. C. Phenology* Program

THE BACK-COVER MAP, first of its kind, is a product of the N. C. Phenology Program (see September 1970, February 1971 issues of **Wildlife**). Within the framework of the International Biological Program (IBP) research efforts to model world productivity, Dr. Helmut Lieth, UNC-CH, has designed a state-wide productivity study of our vegetation. A large part of this effort, the N. C. Phenology Program, owes its existence to volunteers within the state who observed last year the timing and duration of the growing season as indicated by flowering and leaf color-change dates of four different plants species.

The spring observations by Garden Club members, college and school groups, wildlife managers and many individuals provided flowering dates of dogwood and redbud which have been averaged by county to produce the computer-generated "Arrival of Spring" (1970) map. The shadings, intermediate between those of Redbud and Dogwood (one week later), cover weeks from March 19-25 (Red, #1) to April 23-30 (Dark Blue, #6). The program which printed this first phenology map ever made by computer produced black and white shades which then were manually given a color overlay.

With this and other valuable research tools and perhaps 1000 observers (four times the present number), very good work can be done for IBP, the state and, directly or indirectly, you. Should you desire to help with this spring's or later observations, write

N. C. Phenology Program
c/o Mrs. Sally Rogers
Department of Botany
University of North Carolina
Chapel Hill, N. C. 27514

* Phenology is the study of the appearance of life phases as especially related to climatic influences.

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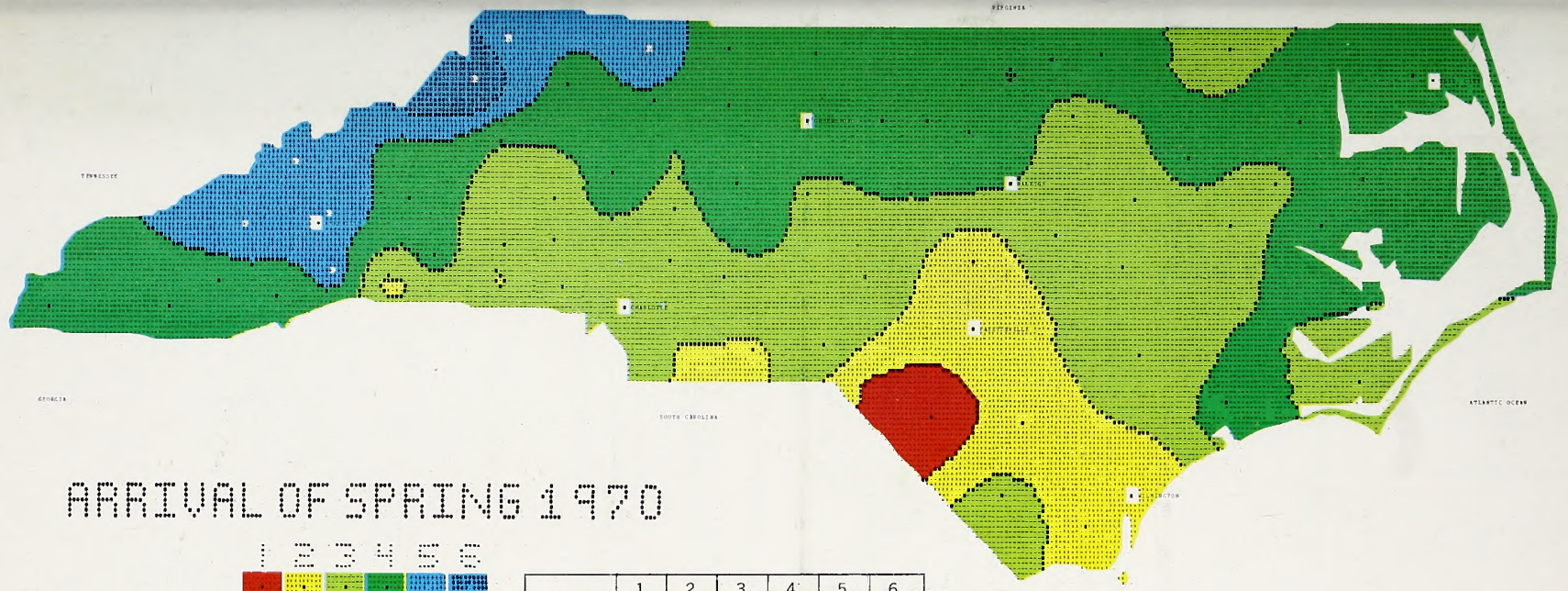

ARRIVAL OF SPRING 1970

1 2 3 4 5 6

	1	2	3	4	5	6
Corresponding Time Period:	MARCH	APRIL				
Calendar Day	19-25	26-1	2-8	9-15	16-22	23-30
Year Day	078-084	085-091	092-098	099-105	106-112	113-120

DOGWOOD

REDBUD

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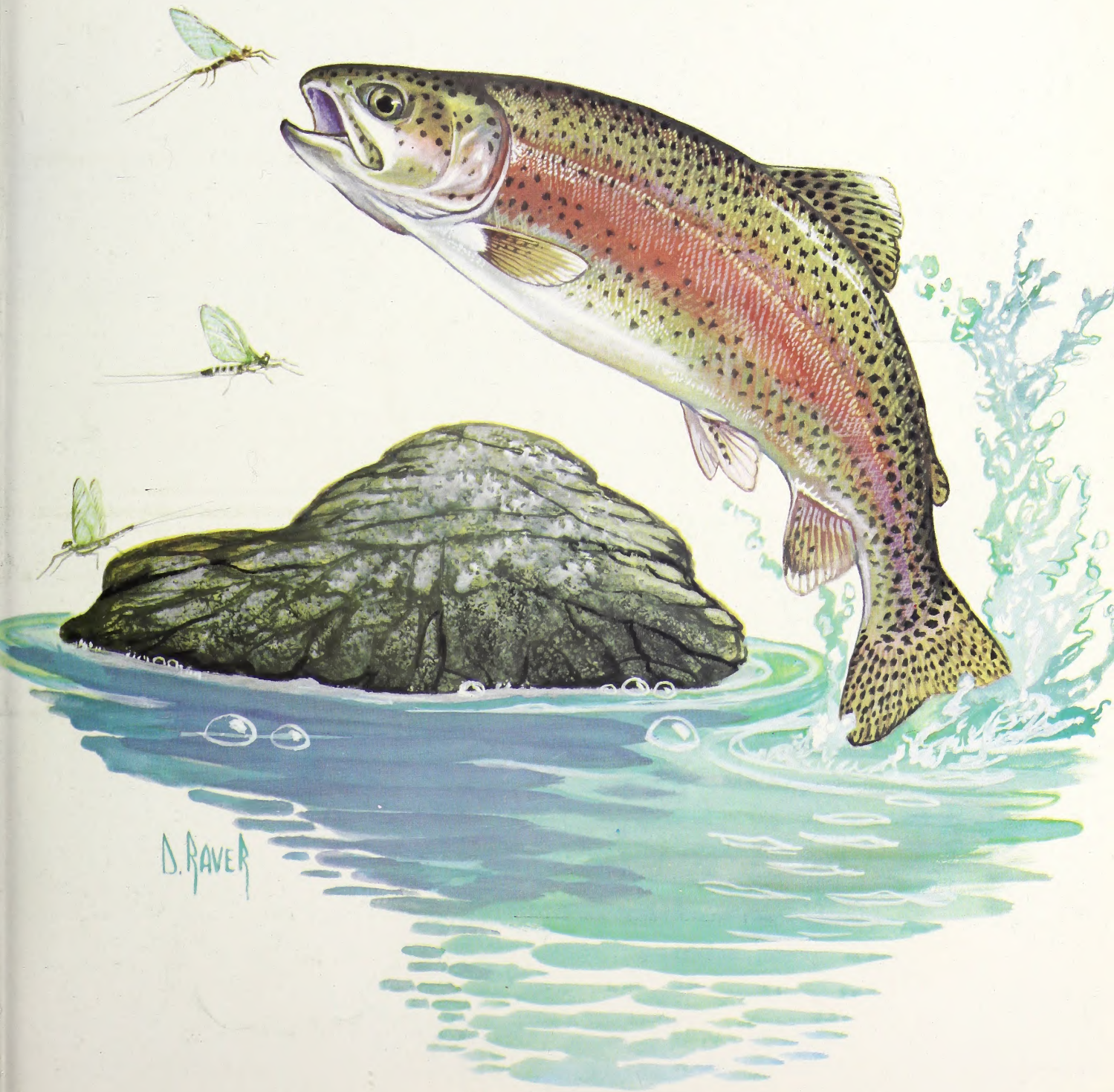

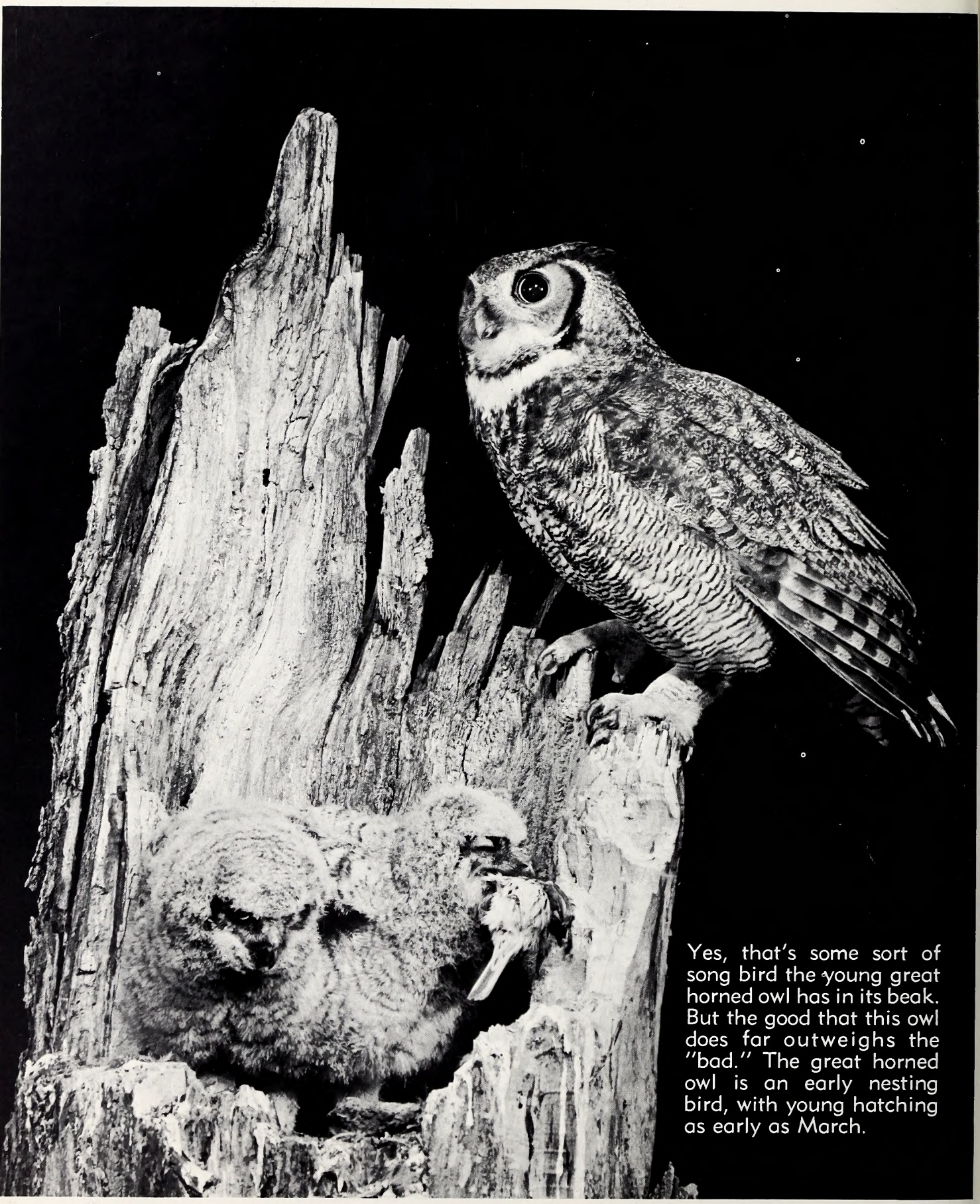

Yes, that's some sort of song bird the young great horned owl has in its beak. But the good that this owl does far outweighs the "bad." The great horned owl is an early nesting bird, with young hatching as early as March.

PHOTO BY KARL MASLOWSKI

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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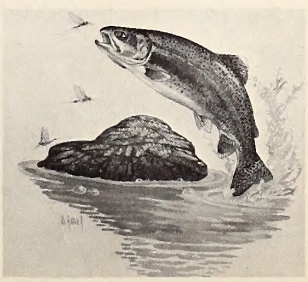
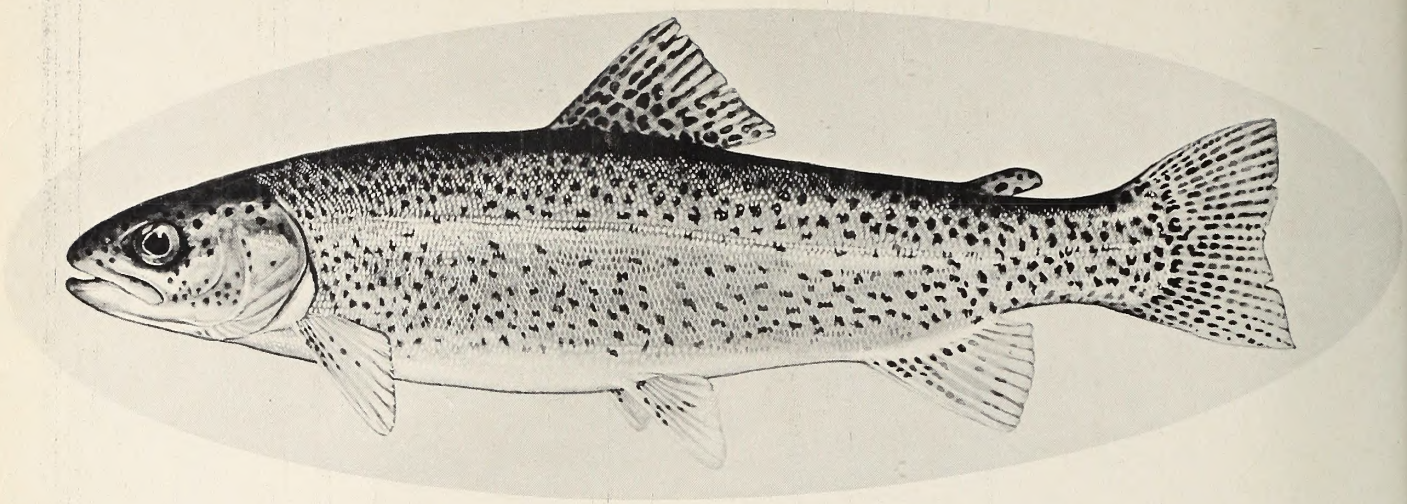


What is there about a trout that makes him so special? Perhaps only a trout fisherman can approach this question and even he may have a bit of trouble putting his finger on it. But without getting poetic about it, trout are important to our wildlife scene, and do require clean, cold, well aerated water with suitable spawning areas. This is a rainbow trout, by the way, painted by Duane Raver.



The Rainbow

by J. H. Cornell
Chief, Division of Inland Fisheries

To the trout fisherman, the name "Rainbow" calls up a mental picture of a beautiful fish that by preference lives in the fast, turbulent water of a clear mountain stream. He visualizes a streamlined fish with a dark back shading to bluish or olive green, with silvery sides, and with a broad pink lateral band extending from the gill cover to the tail. The back, sides, and dorsal and tail fins are more or less covered with dark spots, and on the fins the spots appear to be in irregular rows.

The fisherman will catch a brilliantly marked fish and promptly inform his fishing buddy that he has just caught a "native." The next one may have a much less brilliant shade of red in the lateral line, or may be only sparsely spotted, and he will be equally sure that the trout has just come from the hatchery. But as the old song says, "It ain't necessarily so!"

It is true that most hatchery trout become darker in color after they have spent some time in a stream. A fish tends to match the color of its background. When the trout is taken from a sunlit concrete raceway to a stream with dark hiding places under cut banks and boulders, it is reasonable that there should be some darkening of colors.

Much more important in determining the brilliance of color is the water quality, especially hardness, of the stream concerned. Streams in limestone country usually produce highly colored trout. And equally important is the generic color inheritance from its ancestors, because there is no such thing as a "typical" rainbow trout. The scientist speaks of the "rainbow series," because all of our rainbows derive from one or more separate populations. These populations are so different in apperance that at least twelve valid subspecies are recognized. And to be technical, there is no such thing as a "native" rainbow trout in eastern United States.

Habitat

Rainbows are native to the Coast Range and the Sierra Nevada mountains in California, Oregon, and Washington. The Shasta rainbow, indigenous to the McCloud River and other streams south of Mount Shasta, is the subspecies which has been most extensively propagated in hatcheries and distributed throughout most of the United States.

Smith reports in 1907, in his "Fishes of North Carolina", that "As early as 1880, the planting of young fish (rainbow) in cold streams in western counties was begun . . . ." He continues with the interesting comment that "This fish is adapted to warmer and more sluggish waters than the brook trout, and is in no sense a rival of the latter. Waters that have become unsuitable for brook trout through changed physical conditions may be advantageously stocked with rainbow trout. While inhabiting some of the waters in which the brook trout occurs, the rainbow is for the most part found lower in the streams."

It is interesting to observe that the problem of reduced amounts of waters suitable for the native brook trout was recognized as early as 1880. Our destruction of brook trout habitat by poor agricultural and lumbering practices has continued to the present day. We would have very little trout fishing if it were not for the ability of the rainbow to live under these more adverse conditions.

PHOTO BY KARL MASLOWSKI

The coloration and the markings of rainbow trout vary greatly with individuals of this species. Some are heavily spotted, while many have relatively few spots.

The migratory habits of the rainbow have long been recognized. In their native western rivers, where suitable trout habitat extends all the way to the ocean, some of them move out into salt water for several years and grow to a prodigious size. However, they return to the fresh water streams to spawn. At that time they lack their characteristic colors and are known as "steelheads." In our waters, of course, they are landlocked by the warm waters between the trout streams and the ocean.

Life History

But the migratory tendency is still present, and when no ocean is available the rainbow is willing to settle for a cold lake. In the late spring, as stream temperatures begin to climb, the fish will move downstream looking for larger water. If they can reach a lake which provides suitable trout habitat, they will follow their preferred temperature downward as the surface warms in the summer.

Now lakes usually have a much more abundant food supply than streams. The trout grow very rapidly and soon develop into specimens that produce conversation at the country store—if your line doesn't break.

In early spring, these fish move up the tributary streams and into the smallest headwaters. When they find a clean gravel bottom in water a few inches deep, the spawning beds, or "redds," are made. Using her tail and anal fin, the female scoops out a hollow in the gravel about as long as her body and several inches deep. One or more males usually stand by and watch the operation but have no part in the nest building.

When she finishes her nest and is ready to lay her eggs, the largest male usually chases all the smaller ones away and moves in to fertilize the eggs as they are extruded. He then moves away and leaves her to cover the nest.

Depending on her size and age, a female may lay from two or three hundred to as many as eight or nine thousand eggs. Only a few hundred are laid in each nest. As soon as the eggs have been laid and fertilized, the female moves directly upstream and agitates the gravel as in nest construction. The stream current carries the gravel into the nest, and within a few minutes the eggs are covered. Fresh water can continually reach the eggs to provide them with oxygen, but they are protected by the gravel during the incubation period.

As soon as the eggs are covered, the female moves upstream two or three feet and starts digging the second nest. After an hour or two of hard labor, the second nest is ready for its allotment of eggs and the whole process is repeated. It is noteworthy that the female moves directly upstream in selecting successive nest sites. The current carries the gravel from each successive excavation into the previous one with the result that the nests are almost level when the spawning is completed.

This characteristic spawning procedure explains why rainbow trout lakes must have tributary streams suitable for spawning if the species is to maintain itself. In a lake there would be no current to carry the gravel over the eggs and fill the nest.

But, not all trout streams are tributary to suitable lakes. Or perhaps the water becomes too warm to support trout before the stream reaches a lake.

Rainbow trout are where you find them. It pays to fish each stretch carefully and thoroughly before giving up. White water may be the most difficult to handle, while the glassy pools of fairly swift water should prove the most productive. A stealthy approach to the stream is more important than the fishing techniques themselves.

PHOTO BY JIM DEAN

Or, perhaps more often, the stream is used as an open sewer to carry away untreated wastes from municipalities or industries or silt from lumbering or mining operations. There are many ways to destroy a trout stream, and we can point to repeated examples of most of them—without pride.

When rainbows are sealed off from downstream migration, they may stay in the larger parts of their stream if it is big enough. Cool summer temperatures, adequate food, and large streams free from pollution provide a suitable habitat for their use between their migrations to the headwaters to spawn. If such a habitat is not present, they will move downstream anyway in an effort to find it and will commit suicide in the warm or polluted waters they reach.

Importance

To anyone who is not a trout fisherman, the importance of the rainbow cannot be described. He just would not understand. And the trout fisherman does not need to be told that the rainbow is one of the most desirable fish that swims. Its beauty of color, of form, and of motion; the reckless abandon with which it takes a lure, and its aerial gymnastics in trying to escape the hook; the beauty of the surroundings in which it lives; all these things contribute to the importance of the rainbow as a game fish.

It really is not a difficult fish to catch. When the water temperature is below fifty degrees they will be in the deepest pools in the slow current. At that temperature they are rather lethargic, and their metabolic rate is so decreased they are not very hungry. This is a good time to leave the artificial lures at home and concentrate on drifting a worm or a grub or a hellgramite down into the hole.

As the water warms to fifty-five degrees, wet flies and streamers produce results. Between fifty-five and sixty degrees is when most of the insect hatches take place. The fish start feeding on the surface, and dry flies are the prescribed medicine. At about sixty-eight degrees, they begin to get unhappy because the water is too warm to please them. Feeding is considerably curtailed above that temperature and most of it is done at night. And never forget that so far as rainbows are concerned spinners rate high on their list of preferred artificial lures. Either a Colorado spinner or a fly and spinner combination often will take fish when all other lures fail.

Look for rainbows in the fast water at the head of pools. Feeding fish will be in the turbulent water and on the edge of strong currents. But most important of all is stealth. All trout are extremely wary and can be frightened into hiding by any sudden movement. You can be sure that the fast-moving fisherman, tripping over slippery rocks and walking down the middle of the stream, is getting nothing but exercise.

If you will use suitable lures, fish the water where the feeding fish should be with tackle light enough not to scare them, and move so cautiously that you feel just a little foolish, then you will catch far more trout than the average fisherman. Try it! ⬍

Take the First Step

In the final analysis, the job of cleaning up our fields and waters may become an individual responsibility. We each can make a start.

by Nat White
Soil Conservation Service
USDA, SOIL CONSERVATION SERVICE PHOTOS

WE stood watching fish spawning in a clear stream on George Stanton's farm near Level Cross in Randolph County. "I wouldn't mind drinking that water," Stanton remarked.

The brook flows through good woodlands, managed pastures, hay fields and cropland protected by an excellent conservation program. Looking across the fields, you can see 30 acres of lush corn planted by minimum tillage on land that has not seen the turning plow for more than four years.

A quarter-mile downstream the story changes. The clear brook flows into Deep River, which is heavily polluted. "Those fish wouldn't last long in the river," Stanton said.

But when Stanton was a youngster the swimming hole on Deep River was on the Stanton farm. George and his playmates had a wonderful time swimming and playing. "You could catch a mess of fish any time you wanted to back then," he recalls.

Only 20 years ago the river was an asset, but now it's a mile-long liability on the Stanton farm. "I have seen dead fish in that river many a time," George Stanton said, "and sometimes the smell would be sickening, with so many dead fish. One farmer has even had livestock to die after drinking water from Deep River."

The Deep River fish live a very precarious existence. During much of the year there is barely enough oxygen for them to get by on. Sooner or later the time comes when the oxygen in portions of the polluted stream is consumed by decomposing organic matter, and once again there is a fish kill.

George Stanton is an optimist; he believes there is hope for Deep River. "New laws have stopped some of the chemical pollution, and sewage systems are getting more efficient each year," he says. "Quantities of organic waste can be made into useful by-products such as fertilizer and even animal food."

He also believes in an organization of which he is an active member, the Randolph Soil and Water Conservation District Board of Supervisors. "We're working all the time to clear up streams like this," he says. "The district can help anybody who uses the land to conserve soil and water, and keep them pure. A lot of help is available for such things as sediment ponds and other ponds, as well as lakes that catch pollutants that might enter our streams."

He thinks the job can be done, although it will take time and may not be easy. "But anybody who recalls the wonderful streams we had just a few years ago has all the motivation he needs to retain soil, prevent erosion, and make the water clean again." ◆

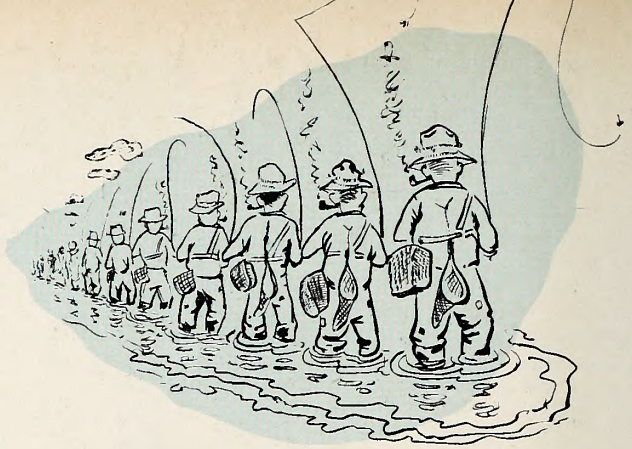
Top photo, silt runoff has been controlled in this field of soybeans planted in small grain stubble. Arlie Culp, left, and George Stanton. Above, minimum tillage in sericea lespedeza.

George Stanton is combining corn on a field with minimum tillage. Excellent crop residue is left on the land.

The Initiation of a True Believer

by Jim Dean

What Hope Is There for the Fanatical Trout Fisherman? . . . Fortunately, None.



ONCE every 365 days, there comes a day when the slings and arrows of fortune seem particularly outrageous.

Trout fishermen know this 24-hour period well. They call it "opening day."

Someone who has never fished for trout might tell you that this is the day along about the first week in April when trout season legally begins. All too true, but this simple explanation does not fully describe the follies of anglers suddenly unbound from the rigors of an armchair winter.

It does not, for instance, explain why a man would willingly arise from a warm bed and stand all day in an icy stream while rain or snow or both pelted his head, and his waders slowly filled with water. Nor does it indicate what it's like to arrive at the stream and discover that an essential reel is conspicuous by its absence.

And what about all the other small misfortunes and indignities heaped upon the heads of April Fools on opening day.

Why do we choose to suffer so much for so little? Why do we march to our fates once a year with smiles on our faces? How was it that we became a part of this annual army of ill-fated anglers?

Perhaps I can explain.

More than anything, I suppose, opening day of the trout season is a sort of "religious observance." You must believe (you will catch a trout) or all is lost. Doubt may be dominant, but no serious angler would intentionally shun the ritual of opening day. There is always the chance . . .

I became a True Believer late. During my early years, I fished exclusively for such rough fish as bass, bluegills, stripers and the like. (I still slip occasionally, but so must all True Believers. Forsaking the straight and narrow can be fun, if not virtuous.)

My Damascus came on a small, over-fished stream in western Maryland. Big Hunting Creek is a fetching piece of water, but it has long since seen the day when an abundance of stream-bred trout hung in its pools and riffles. Now, for the most part, Hunting Creek is a put-and-take stream which is stuffed each year with pallid hatchery trout.

The Hunting Creek caper may sound familiar to those who have been initiated into the brotherhood of trout anglers.

In the year 1962 BT (Before Trout), I had an angling friend in Maryland. We fished together occasionally, and told each other lies frequently. He would listen appreciatively when I told him of some exploit with a lunker largemouth bass, but I noticed that he always had a sad look in his eyes. I have seen that same look in the eyes of my minister who once spotted me leaving a Baltimore bar.

"Opening day is Saturday," said my friend one day. "You will go with me to Big Hunting Creek where I will help you to a richer understanding of life."

"Opening day of what?" I blasphemed.

"Trout season, of course," he said, barely hiding his contempt.

The night before our pilgrimage, I gathered what gear I had; a long fly rod which I used for bass, a few sickly flies, a cloth creel and a pair of hip-boots which I must have borrowed from the Colossus of Rhodes.

We arrived at Big Hunting Creek at cold dawn on opening day. Already, there were half a dozen cars parked along the road. The steam from their exhausts mingled with thick smoke which drifted out of the slightly opened windows. As it grew light, we got out of the car and began to dress. To a man, every angler in sight was smoking a pipe. I asked my host about this strange behavior.

"Don't you smoke a pipe?" he asked.

"No, must I?" I answered.

"Of course," he replied.

I was beginning to see that if I was to become any sort of trout fisherman, it would be necessary to expand my vices by at least one.

Finally, we were ready, and at some subtle signal which I didn't catch, we all tromped off through the woods to the stream.

My friend gave me a few more flies, a tapered leader, and a word of advice.

"Trout fishing is a lonely sport," he said. "Solitude is most desirable. Therefore, seek ye not a pool where another brother is angling."

"But every hole is taken already," I complained.

"Seek and ye shall find," he replied, and headed downstream,

leaving me shivering in an alien environment.

I went upstream, following the trailing smoke of several pipes, noting further that each and every angler—except myself—was clad in a red plaid shirt, patched waders, a crumpled hat with trout flies in a wool band, and a vest with some sort of patch on it. Each angler carried a bamboo flyrod, a wicker creel, and had a net hanging between his shoulder blades.

Finally, I found a stretch of water not under the immediate attention of anyone else. I tied on a dry fly — something I thought my friend had called a Female Adam. It occurred to me at the time that a Female Adam would be an Eve, but who was I to question.

I began to cast, and noted with satisfaction the gentle curl of the line. Despite my long rod, I was able to stay clear of the trees and undergrowth on most of my backcasts. In about an hour, the sun actually came out and the ice in my guides melted.

I became intrigued with the tiny bit of fluff that drifted on the cider currents, but if any trout were so entranced, they admired my expertise from a distance.

The morning wore on, and more anglers trod the stream, each dressed alike and all puffing briers. I once spotted an angler smoking a cigar and felt an instant kinship with this curious nonconformist, but we did not speak.

I met my friend at the car for lunch, but he had obviously caught nothing.

"I released three," he said. "How did you do?"

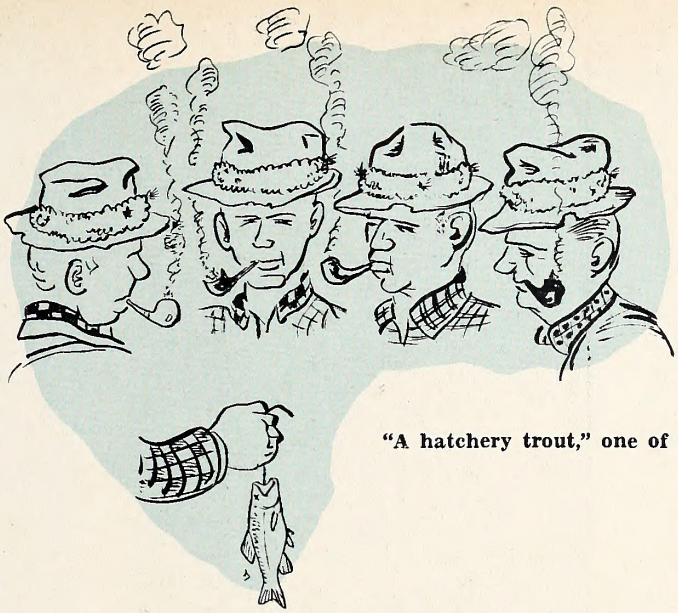
"I released all of mine too," I said with a smirk.

"You don't believe me," he said in a shocked voice.

"Why should I. You have no fish in your creel."

"You have a lot to learn," he said.

After dinner, I made a point of asking each angler I saw whether he had caught any fish.



"A hatchery trout," one of them said.

All advised me that they had indeed taken fish, but none furnished any proof.

Almost exactly ten hours after I first entered the stream, a most unusual thing happened. I caught a trout.

This impossible accomplishment did not come about in a way I expected. I had long since abandoned the accepted practice of casting a dry fly upstream, and was standing at the head of a deep pool fishing downstream with a small, white streamer.

I don't recall how long I had been there, but I had been there long enough to lose all track of time and hope. I was retrieving slowly up the middle of the pool when something snatched the line and the rod bent slightly near the tip. A fish of some sort thrashed the water, then circled under the surface several times before I slid him up the muddy bank and leapt upon him.

I washed the mud off, and beheld my first trout. He was nine inches long, and his flanks were battleship gray relieved by a spattering of faint spots. His fins were the palest red with a muddy, white bar along their tattered outer edges. He didn't look like the pictures I'd seen of brook trout, but I knew instinctively that he couldn't be anything else.

I immediately marched back to the car where my friend was waiting with some other red-plaid-shirted, pipe-smoking anglers.

"A hatchery trout," one of them said.

"Show me your fish," I cried exultantly.

"We released them," they said in unison.

Perhaps they did; I will never really know. What I know is that one miserable, nine-inch hatchery brook trout which wouldn't know a nymph from a nymphomaniac had fallen upon hard times at the hands of an angler who didn't know Hewitt from Halford. His act of sacrificial kindness has cost me a great deal.

Thus were the first seeds of True Belief planted. They have prospered. I have bought red plaid shirts, crumpled hats, bamboo fly rods, learned to smoke a pipe and never missed an opening day—nor any other day I can fish for trout without losing my family or my job. (So far, I have not seriously risked the loss of family or employment, but perhaps I have not yet had to choose). No one but a brother in the fraternity could understand the fanatical monster my friend unleashed on Hunting Creek that day. Trout fishing attacks the very soul, and opening day is the day we are judged fit enough to live another season.

So be it. I would not have it any other way. ◆

Lake Waccamaw's Mystery

by Paul Jennewein
Wrightsville Beach
PHOTOS BY THE AUTHOR

THE ocean could be man's last frontier. But about 40 miles from this frontier in North Carolina lies an area of mystery involving a class of animals related to the sea—fresh water mollusks.

Making a start at learning more about this puzzle was a group of about 25 persons who gathered at Lake Waccamaw one summer morning in 1970.

"This will spoil you for shell collecting," Dr. David R. Stansbery told the group. "The water's crystal clear. This is rare for fresh water collecting. You can collect by sight and you don't have to go very far out to find the shells. It is also a calm day and sunny."

Dr. Stansberry, one of the nation's foremost fresh water shell authorities, had agreed to lead a field trip for the North Carolina Shell Club on his return from a meeting of the American Malacological Union (AMU) in Key West, Florida.

He is curator of Natural History for the Ohio State Museum, Columbus, Ohio, and his specialty is fresh water mollusks. He was accompanied by Dr. William J. Clench, retired head of the Museum of Comparative Zoology at Harvard University, Cambridge, Massachusetts, another person who has specialized in mollusks.

Stansbery and Clench were attracted to Lake Waccamaw because of its peculiar fauna, especially among mollusks, and particularly because little actual investigative work has been done in North Carolina in the field of malacology.

At the morning session, in outlining to participants what they might expect to find, Dr. Stansbery pointed out that Lake Waccamaw was the only lake in this country with seven known species of bivalves and two species of gastropods (snails). Among them is a bivalve, or mussel, identified as *Elliptio waccamawensis*—found in no other lake in the world.

The seven known species became eight two days later, however, when Dr. Stansbery found another species of bivalve by diving at the center of the lake.

"This species belongs to the genus Anodonta," he said later, "and is probably the species *Fluviatilis* Gmelin, 1791. It can be identified easily because it completely lacks hinge teeth.

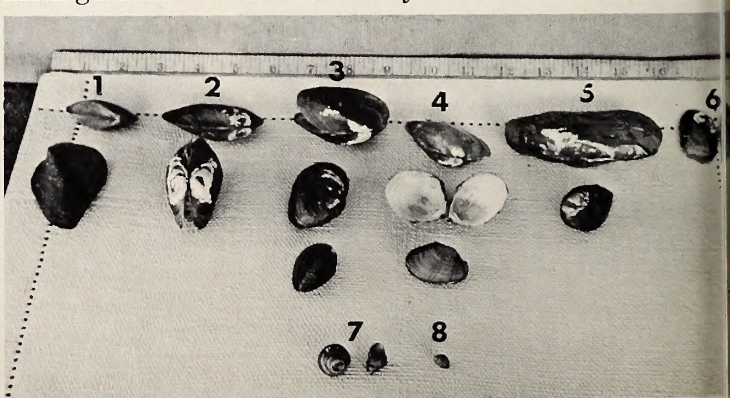
"I am now quite certain that Lake Waccamaw has more species of naiads recorded than any other coastal plain lake on our eastern seaboard. Lake Erie, really a wide place in the St. Lawrence River, leads the list for lakes in North America with 30 species recorded.

A field trip around the north edge of Lake Waccamaw was led by Dr. David R. Stansbery (in T-shirt and swim shorts), Curator of Natural History for the Ohio Museum, Columbus, Ohio.

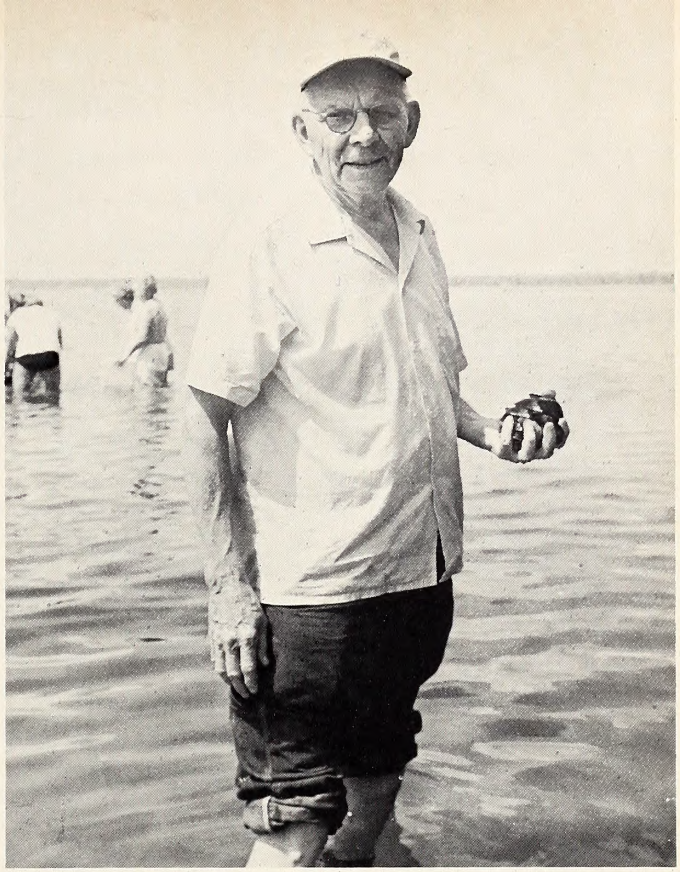
"Waccamaw, however, is a true natural lake and may well contain more naiad species than any other such lake in the world."

Naiad is the collective name for fresh water clams or mussels. During the first few hours of wading in the shallow waters at the edge of Waccamaw, the shell collectors found all seven species of bivalves and two species of snails. Most of them were alive. Soon each collector had handfuls.

Picked from the sandy bottom were *Lampsilis ochracea, Elliptio folliculata, Elliptio complanatus,* another of the *Lampsilis species,* one of the subfamily ambleminae—Unionae in part, and rarest of the day (with only two specimens found), *Villosa conradi. Elliptio waccamawensis* was easily distinguishable and soon easily found.



1. Elliptio waccamawensis; 2. Lampsilis sp.; 3. E. complanatus; 4. L. ochracea; 5. E. folliculata; 6. Villosa conradi; 7. Campeloma decisa; 8. Lioplax carinata.



Dr. Stansbery (right) checks bivalve handed him by Mrs. J. B. Barefoot of Lake Waccamaw. Bob Kramer of Chapel Hill checks face mask, while Mrs. Linda Nutwell of Wilmington examines another mussel. In photo at right, Dr. William J. Clench holds handful of fresh water shells taken from bottom of Waccamaw.

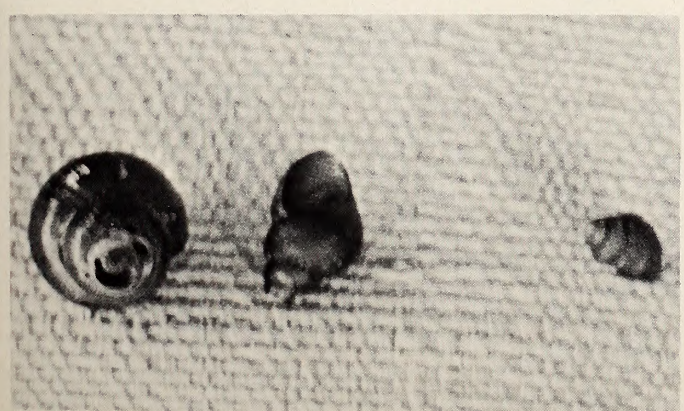
Most attractive to the eye, however, was the rounder *Lampsilis ochracea* which turned up in various shades, from light green to brownish orange. The younger specimens had distinct rays. Inside, they were mostly pink or pink orange.

After being cleaned, *Elliptio folliculata* (the cigar-shaped one) revealed an attractive inner nacre of lavender.

Most *Villosa conradi* have bright rays of more pronounced nature, but the two specimens found were of dark walnut color.

Both gastropods known to be in the lake were found. The more common was *Campeloma decisa,* the variety found in many fresh water aquariums. Lower down under the sand at the bottom was *Lioplax carinata,* a snail with sharp ridges on the whorls.

Since fresh water shell collecting isn't as popular as marine shell collecting, common names haven't cropped up. Hobbyists have to brush up on their biology Latin. To be accurate, malacologists—as scientists interested in mollusks are called—refer to various species by the universal Latin names. The first person to discover and describe in a scientific publication any new species gets the right to hang on the label—in Latin.



This is enlargement of Campeloma decisa (two views) and Lioplax carinata. Invariably the spire of Campeloma is broken off.

"You can call them what you want," Dr. Stansbery told the group, which was having trouble with the Latin names. "The Waccamaw species is found nowhere else, so you can call it what you want, Waccamaw clam or Waccamaw mussel."

To a 12-year old moppet who lived on the lake, he suggested preparation of a small booklet with drawings of the shells and their names as a school project.

"This has never been done before and you could give the shells common names," he said. "Thereafter, they'd be called that."

The Waccamaw clam has a sharp ridge or keel near the hinge. This distinguishes it from the other species found in the lake.

Little work has been done on North Carolina's fresh water shells. Other lakes, like Greenfield Lake in Wilmington, have their distinctive clams, also found in no other body of fresh water in the country. Dr. Clench, and his successor at Harvard, Dr. Kenneth Boss, studied the mollusks at the Neuse and Tar River, finding the species in one watershed different from those in the other watershed. But other lakes and rivers in the state have been virtually neglected. White Lake in Bladen County, for example, is still virgin territory.

Why is it that the Waccamaw clam is found in

no other lake? How do distinctive species develop?

Dr. Clench explained it came from the reproduction cycle. The clam at its female state, spewed out its eggs, to be fertilized by a clam in its male state. However, for the fertilized eggs to become clams, the embryo has to become attached to the gills of a certain type of minnow. The embryo becomes parasitic on the fish until it reaches a certain size and is either sloughed off by the fish or drops of its own accord to the sand below. The certain type of fish must be present where this clam lives for the reproductive cycle to continue.

One of Dr. Stansbery's projects during the weekend he spent at the lake was to collect a "growth series" or a series of graduated sizes of the various kinds of shells found in the lake. He was planning to return to the area at another time to collect fresh water shells from the Waccamaw River to see how they compared with those found in the lake itself.

Residents of the Lake Waccamaw area are aware of the bivalves found in the lake but have never considered them worthy of collection or study.

Rome Lytton, Lake Waccamaw Town Board member, who made available the air-conditioned meeting hall to the Shell Club group, explained that some of the youngsters use them as bait and muskrats have thrived on them. The clams are edible but not tasty and Lake Waccamaw is considered polluted at certain times of the year.

More valuable to townspeople (Lytton has an extensive collection) are the fossil shells, casts and sharks' teeth found at the north side of the lake. They are the remains from animals that inhabited the area about 160,000,000 years ago, when Lake Waccamaw and the entire coast up to the Piedmont was covered by the ocean. When the water receded, the lake was formed.

One of the puzzles for fresh water shell collectors, Dr. Stansbery explained, is how certain fresh water clams and mussels developed and how they were brought to a certain watershed.

Undoubtedly, he said, over the years, rivers meandered from their courses and deposited these mussels in nearby marshes and ponds. Still unexplained, he said, is what body of water could have been responsible for the shell life found in Lake Waccamaw.

It has been estimated, with fairly good authority, that about 500 species of marine seashells can be found in the waters 40 miles from Lake Waccamaw and up along the North Carolina Coast. Collecting marine shells is popular, although no one really has that many in his collection. But there are instances where many more than half are in shell cabinets with labels.

In the field of fresh water shells, however, no one really knows how many can be found. Scientists are beginning to poke into the subject. But it's virgin territory and, as of now, a wide open frontier. ◆

1971-72 Hunting Regulations Public Hearings

Hunters and all interested persons are urged to attend the public hearing nearest them to discuss the hunting regulations that will be adopted by the Wildlife Resources Commission for next hunting season. The dates and locations are listed below:

May 4, 1971	District 9	Sylva	Courthouse	7:30 p.m.
May 5, 1971	District 8	Morganton	Western Piedmont Community College	7:30 p.m.
May 6, 1971	District 7	Yadkinville	Courthouse	7:30 p.m.
May 7, 1971	District 6	Albemarle	Courthouse	7:30 p.m.
May 10, 1971	District 5	Graham	Courthouse	7:30 p.m.
May 11, 1971	District 4	Elizabethtown	Courthouse	7:30 p.m.
May 12, 1971	District 3	Rocky Mount	City Court Room	7:30 p.m.
May 13, 1971	District 2	New Bern	City Hall	7:30 p.m.
May 14, 1971	District 1	Edenton	Courthouse	7:30 p.m.

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Commission Conducts Public Relations Seminars

A series of public relations seminars was held in each of the Wildlife Commission's nine districts last month to brief field personnel on the techniques of working with newspapers, radio and television stations, and with organized youth and adult groups. The series was conducted by personnel of the Division of Education. Emphasis was placed on the growing interest on the part of the general public in wildlife conservation and matters pertaining to total natural environment, and the fact that Commission field personnel have a vast store of knowledge of interest to news media and the general public.

April is a Big Month for Outdoor Activity

Tarheel outdoorsmen now have what they have waited for all winter—April—the month that sees the beginning of intense fishing and boating activity. Biggest fishing news is the opening of the mountain trout season in some 2,000 miles of trout streams, followed by the annual shad and herring spawning run, then the spring run of striped bass. Salt water fishing will begin in earnest, with a few red drum having already shown up in the surf in March.

Warm weekends will see swarms of pleasure boats on the more popular boating waters of the state.

Boaters, Anglers Cautioned

With the onrush of outdoor activity, be sure to have in your possession a required, valid fishing license while fishing the public waters of the state, and in case of boating, be sure your boat—if it is powered by machinery of more than 10 horsepower—is properly numbered, equipped with required safety devices, and that the person operating the boat has a 1971 boat registration certificate.

Note on public hearings for hunting and trapping regulations—see page 12.

CARP WITH A BOW

by Frank Mooney
Rougemont

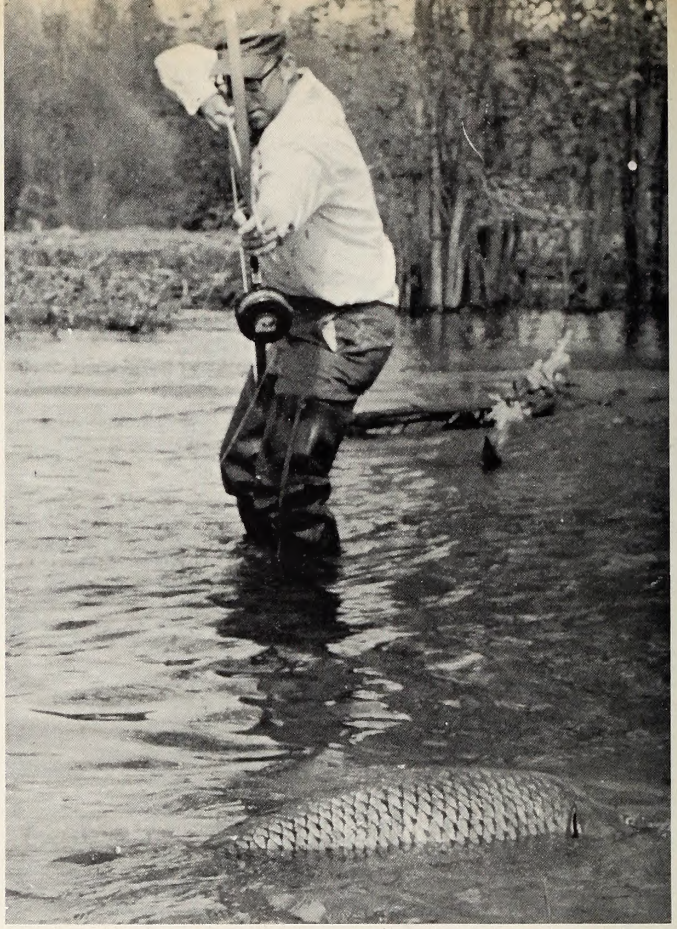
CARP with a bow makes for an exciting and unusual sport. Although most anglers frown upon the lowly carp, bow fishermen place this fish high on the list of active targets. The carp is now one of our most wide-spread fish found in the United States. This fish roots like an aquatic hog, often muddying the water making it undesirable for more sought-after game fish. When the bow fisherman arrows a female carp of about 20 pounds before she spawns, he removes a potential two million eggs from circulation. I have been able to observe carp spawning (in the act of releasing their eggs) and have seen the adhesive eggs stick to tree roots, water plants, grass, logs and other debris.

Spring is the best time to try carp with a bow as the fish crowd into shallow streams or gather on mud flats of a lake to spawn. When possible, carp stay in or near some type of debris in the water waiting for the right moment to release their eggs. At this time close stalking is necessary before you can sink a shaft. At times, these wary fish are almost impossible to stalk, then again when they're in the act of spawning they may bump into your waders as they swim around you. Some archers wear camouflage clothing and keep low when stalking schools of fish. This is an exciting time and it may be difficult to pick out a single target from the swimming mass of fish.

Shoot Straight

This will start adrenaline pumping into your veins, and if you're not careful, symptoms of buck fever (or maybe I should say fish fever) will creep up on you. Usually light refraction is no problem in carp shooting. Most fish are on or near the surface; for deeper fish, shoot a few inches short. After I missed several shots in deeper water I got the hang of it. How much allowance for light refraction depends upon the range, depth, and the angle.

Carp are respected food fish in Europe and Asia, this being one of the reasons for their introduction into the United States. However, the flesh of carp did not catch on here like it did in Europe. Now with fishing pressure light on this species, they have multiplied to be one of the dominant fish in many streams and lakes. Whether you hunt carp on the Hyco River in North Carolina or the Susquehanna in Pennsylvania, the excitement and the methods are much the same.



Steady now, the moment of truth is here. After stalking the big carp, this is no time to blow your chances. Ready, aim . . .

One warm April afternoon after work (and the school day finished), my son and I decided to fish for largemouth bass. The day before I had boated two bass, the largest 5½ pounds. We passed a small stream and saw huge fish wallowing in the shallows like hippos. All thoughts of bass vanished in those few seconds. Turning around we sped for home for my bow. What happened after that was an exciting and memorable afternoon. Bret was too young to draw my heavy bow, but he stood on the bank to enjoy the fast action. These monsters were in inches of water, often with back and dorsal fin knifing the surface. Crouching low I eased within a few feet of a large fish, wondering if it might take arrow, bow and all from me.

My heart was pounding hard as I drew to full draw and released. The solid-glass arrow hit the water with a loud slap, piercing the huge fish. The powerful carp rolled on impact, churned the water to a froth in its violent effort to escape. The shaft sliced the surface as the fish bore for deep water. I grasped the braided nylon line and hung on.

Spooky Fish

These wary fish are easily spooked in shallow water, and often when the arrow slaps water you can see wakes of fleeing fish making a beeline for the safety of deep water. Before they scattered, I successfully arrowed several large fish, the largest pushing the scales over 26 pounds.

With bow fishing you combine both the skill of

A pretty good morning's work on the big, egg-laden, carp. The author displays the outfit he uses to snaffle the big ones.

hunting and fishing. Another enjoyable way to fish is to attach a fish arrow to the line of an open-faced spinner. Get your buddy to take the rod and disengage the bail and get ready to wrestle the fish after you make contact with the arrow. While your buddy is fighting the fish, you can look for another target.

After spawning time, the fish are harder to stalk and harder to see since they spend more time in deeper water and watching for predators. As the doldrums of summer creep upon us the water levels of most streams and lakes drop. Dams on lakes and streams, creeks that almost dry up, or any obstruction that slows fish from moving upstream are good places to shoot.

When hunting a small stream, stay on the shaded side, fish usually lie near logs, rocks, stumps, or under shaded banks. The shadow of the bow fisherman will send a fish scurrying for deep water. When wading a stream, hunt upstream because fish will be facing the current, and the bow hunter needs all the advantage he can get.

Some bow fishermen hunt from a boat in pairs, taking turns at the bow while the other handles the boat. When floating the shallows of a lake or a small stream, huge, vicious-looking garfish can often be a bonus for the bow hunter. Once when wading a small stream I watched as two large garfish hunted together pursuing a bluegill so hard that it ran aground. It managed to flip back into the water and make good its escape.

If you are the ingenious type you might want to make your own bow reel and fish arrow. The bow reel is a cylindrical object from which the line uncoils when the arrow is shot. A crude fish arrow can be made from a wood field arrow. First drill a hole at an angle with an undersize bit through the shaft just aft the metal head, then drive in a long nail. Make another hole near the notch where the line will be fastened, after being tied near the point.

Bow fishing equipment is inexpensive and a powerful bow is not required. Women and children can enjoy this great sport. The range is often 10 to 30 feet, and most bows will drive a heavy arrow through a fish at that range. Bow reels that can be taped to your bow run about $3 or $4; solid glass fish arrows with fish points, about $2 or $3. The solid glass is heavy which helps to penetrate the water and the fish. Large fish can roll on a wooden shaft and pop it, but the solid glass shaft can withstand much punishment.

Most fish arrows have tips that are removable or when the point is forced through the fist the barb can be adjusted and withdrawn. Be sure the line is attached through the hole near the notch; if the line is tied near the fish point, it will cause the arrow to have some drag and be off course. Usually the line used in fresh water is 80 pound braided nylon.

Salt Water, Too

Now the sport of bow fishing has spread to salt water. On the shallow flats sharks and rays are much sought-after targets there and the archer often coils the line on deck or seat and fastens the line to a float to throw overboard after the arrow has been shot.

This is not for the novice bow fishermen and can be a sport to work up to later on. Often several arrows are needed before a shark can be brought to gaff. Then a clout on the snout or a bullet is necessary before bringing it aboard. Be sure to check your state regulations and license requirements before bow fishing.

For a North Carolina Bow and Arrow license, write the N. C. Wildlife Resources Commission, Box 2919, Raleigh, N.C. 27602. Resident license only costs $1.75—a lot of action for a small amount.

Here is a recipe for the carp lover. Skin the carp, then slice off all dark outer meat, including the "mud vein." Actually this vein is the lateral line which is part of the nerve system that runs down both sides of the fish. This area is surrounded by strong-tasting meat. Soaking overnight in salt and soda solution takes care of any strong taste. Then steak the meat into thin strips, roll in corn meal and fry in deep fat. Also smoked carp is relished by many people in the know.

Springtime when the carp have their mind on reproduction is the best time to bow hunt; however, when the doldrums of summer send your favorite game fish to deep water and hot water restricts their movement, string your bow and try the lowly carp. You will be amazed at the power of these huge fish. It's a great sport and you are making more room for your favorite game fish, too. ▲▼

PHOTO BY JOEL ARRINGTON

Will Even the Vulture Vanish?

by Nell Joslin Styron
Raleigh

CIVILIZATION has a way of pushing out our wildlife. It seems that even the turkey buzzard is on the decrease now. Farmers in Wake County say they are not the common sight they were, and city folk seldom see them.

"Turkey buzzard, turkey buzzard, lend me your wing
To fly over Crabtree to see Sally King."

But this was a rhyme 50 years ago when turkey buzzards frequented the old Raleigh City Market. They roosted on the clay tile roof waiting for handouts.

In the country they used to stand on the top of a chimney to take advantage of the heat arising with the smoke. One 90 year old farmer's widow remembers the buzzards used to roost in a dead tree right at their pig pen and her husband used to shoot at them because it was believed then they carried hog cholera on their feet from one pig pen to another. Grady Miller, the Wake County Agent, says that the problem is much more complex and that buzzards are not the culprits.

Although he is not on the list of birds protected by law, the superstition has it that it is bad luck to kill a buzzard; this rather than any love for him has probably helped keep him alive.

If you do kill a buzzard, the saying is that you will have chills and fever. And it is suggested that you wear a string of buzzard feathers around your neck to keep off fever and wear a buzzard feather behind the ear to prevent rheumatism, also use buzzard grease to cure rheumatism.

Although he serves a useful purpose—scavenging carrion—the turkey buzzard has never been honored. No state has chosen him for their bird and he seems repulsive to most people.

But Wilbur and Orville Wright studied the turkey buzzard to see how he handled the problem of precise aerodynamic control and Orville commented: "Learning the secret of flight from a bird was a good deal like learning the secret of magic from a magician."

The turkey buzzard ascends in slow spirals and soars on the wind currents. He has a six-foot wing spread and could be mistaken for an eagle.

When the turkey buzzard comes to earth to nest and feed, his proportionately small head is noticed bare of feathers, a ghastly red color as is his neck. His beak is hooked but he does not use it to kill animals since he will not eat freshly killed flesh.

He has no song, no call, only a hissing when interrupted while feeding. But their young are very noisy. They usually lay two spotted white eggs in the hollow base of a tree, within a hollow log or in the shelter of an overhanging rock. The young buzzards have black heads; not until they are grown do they develop the red heads and red necks. Graceful in the air, on the ground the turkey buzzard moves with a hunched up sidewise hop and stuffs himself so full of carrion that he is unable to fly wtihout disgorging.

Since they are known to feed on dead animals, the sight of a turkey buzzard circling over the same spot always hinted of approaching death. For a long time scientists were sure turkey buzzards possessed an acute sense of smell, but the Michigan State Zoology Department several years ago declared that their tests seemed to indicate buzzards are unable to detect carrion by smell but use visual clues only in locating it.

It does not take a large animal to interest a buzzard—he will stop for a dead snake or rabbit. If the traffic were not so heavy on the highways, the buzzards might clean up the dead bodies of animals killed.

It seems sad that our stricter sanitation laws requiring burial of dead farm animals have worked a hardship on the buzzards who have always lived near us.

Next time a speck is seen soaring in the sky it probably will be an airplane. Man has learned the turkey vulture's secret well. ◆

Bald Birds

By Nell Lewis
Greensboro, N. C.

MAN no longer holds a monopoly on bald-headedness; the number of bald and balding birds in our state is large and growing. But the presence of these pathetic creatures is a recent phenomenon, not confined to any one area, nor is the malady more prevalent among any one particular species, though a greater count of stricken cardinals has been noted.

Numerous reports of cardinals, bluejays, blackbirds, sparrows, mockingbirds, robins and titmice having lost their crowning glory were received in response to a Nature Trail article (Greensboro Daily News, September 6, 1970) in which bald cardinals were mentioned. It was interesting to note, however, that no one wrote of having seen baldness among mourning doves or quail, both ground birds.

In all my years of birdwatching, I did not see a completely bald bird until the autumn of 1967. A cardinal, his magnificent crest gone and the skin of his head scaly white, came to a feeder each afternoon. He came always late, after all the other birds had winged to their night stations. It could not be determined if his timing was due to his own embarrassment or whether his kin disdained him.

Surely spring would restore his crown! But no; he went his lonely way, season after season, bald and unattractive. He was never seen with a mate, nor was he ever heard to sing.

The late John Bonitz of Greensboro had spotted a bald bluejay outside his bedroom window in September and expressed his amazement over how small its head was, compared to the unruffled beauty of its large body.

Various reasons for the plight of the birds have been offered. The majority of people feel that the birds are merely molting. This, however, is not plausible; molting creates an overall disheveled appearance, and the affected birds are otherwise smooth.

Others feel that possibly the hapless birds have simply had a losing battle with another male, or with a cat or squirrel. If this were the case, the head feathers would eventually grow back; also, other areas of the body would show results of such an encounter.

It is apparent that birds are suffering from a skin disorder, either the result of mites or, though it may seem far-fetched to some, from an intake of insecticides or bodily contamination with these poisons.

Birds have been observed furiously scratching their bodies, especially around the neck and head. A handsome flicker, watched through binoculars, scratched until blood oozed from his throat.

A row of powdery indentations along the sunny, southern side of my house is in almost constant use by birds taking dust baths. They roll their heads repeatedly in the fine dirt, sometimes taking so long that those waiting their turn grow impatient and instigate a fight.

One reasonable theory for this outbreak of discomfort and disparity among our feathered songsters is that the blackbird rookeries scattered across the state not only spawned disease and vermin among its kind, but has been spread to other birds by these unwelcome far-wanderers. It is a disturbing thought that, if this is possible, it could easily reach epidemic stage. What then, could man do to aid his valuable allies; destruction of these rookeries has, thus far, not been realized.

Old age is not likely to be responsible for the balding of the birds. Today, when their natural habitats are being destroyed, robbing them of both food and water, and with the air they breathe filled with pollution of various kinds, it would be difficult to believe that birds live longer than they did before these problems were present.

If man has inadvertently created another monster he should expedite a means of control now; his survival depends on the same healthy environment as that of nature's lesser children. ⬍⬍

What's Really Planned for Bald Head?

by Jim Dean

PHOTOS BY HARRY KNICKERBOCKER

THERE are some widespread and serious misconceptions about what's planned for Bald Head Island.

Almost everyone is familiar with the battle between developers and conservationists which is being waged to determine the Island's future. Bald Head is currently owned by the Carolina Cape Fear Corporation, which is presently in the early stages of developing the Island.

The misconceptions have arisen largely through statements made over the past year by Carolina Cape Fear Corporation Chairman W. R. Henderson of High Point.

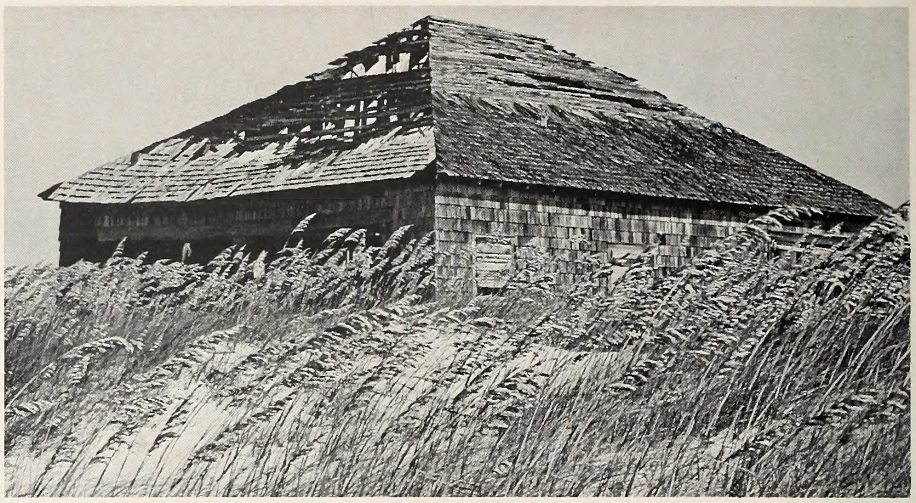
Henderson has left the impression that only one-third of the Island will be developed, while the rest will be preserved in its natural state.

"A total of 4,200 acres will be developed, or about one-third of the property," Henderson has been quoted as saying. "The 4,200 acres will comprise the bulk of the land above knee-high water."

It is interesting to note that the recently completed "Study Of State Uses Of Smith (Bald Head) Island" by the Research Triangle Institute shows that there is a total of 10,900 acres in the Bald Head Island complex, of which only 2,700 acres at the most is high land.

It is apparent from Henderson's statement that Carolina Cape Fear not only plans to develop the entire Island, but also to fill some 1,500 acres of priceless marsh it may not even own.

The state claims it owns some 9,000 acres of marsh at Bald Head, including those 1,500 acres which Henderson says Carolina Cape Fear Corporation will develop. To further confuse the issue, Henderson has been quoted as saying that Carolina Cape Fear Corporation "will not dispute the state's claim to marshland, but boundary lines will have to be resolved."



A relic of the past, remnants of the old pilot house on Bald Head wait quietly for the next move. Is it impractical to want it left in its present natural state?

Years of Atlantic storms and brilliant sun have been absorbed by the shingle siding. What's the next view for this tattered window?

On the planned 4,200-acre development, Henderson had indicated that there will be a large convention center, single and multi-family housing, motels, a mile of public beach, a 50-acre yacht basin and club, a 15-acre amusement park, a sailing marina and public and commercial marinas, two 18-hole golf courses, a tennis club and other facilities.

Is this the "low density commercial development" that Henderson has promised? Is it the "forest-wilderness area" he has spoken about?

LAST, year, Henderson said that the Island (presumably the 4,200 acres) would have an ultimate population of as many as 60,000 people. That—in addition to buildings and other facilities—would place about 14 people per acre on the Island. More re-

The pier to this boathouse is the one reputedly "improved" upon by the current developers of Bald Head. The surrounding marsh is of critical importance to a myriad of sea life.

To the untrained eye, salt marsh has the appearance of being rather devoid of life. Actually, just the reverse is true. Once the marsh is gone, entire communities of important animals go with it. Development of any kind would be difficult without harming this area.

cently, the Carolina Cape Fear Corporation has dropped the total population figure to 16,000 to 18,000 people—still a staggering number.

Is this what Henderson means when he says Bald Head will be "the perfect marriage of development and conservation"?

Is this the "totally-controlled, wilderness-like living" Henderson has said would be characteristic of Bald Head after it is developed? There is no such thing as a "totally-controlled, wilderness-like" area. It is a contradiction in terms.

In order to block the strident objections of conservationists and those who would prefer not to see Bald Head's ecology threatened, Henderson has promised that the Island will be "open for all North Carolinians and still conserve the flora, fauna and marine life."

How this will be possible under present plans is not explained.

A clue to Henderson's respect for the conservation aspects of the Island may be gleaned from his statement that he has "conferred with scientists who indicate that there is nothing unique about the flora, fauna or marine life on or around Bald Head." Henderson doesn't reveal the names of his scientists, but many prominent scientists have said that Bald Head's flora, fauna and marine life is unique in many ways.

One of the keys to any development of Bald Head lies in the dredging and filling of its marshes. Governor Robert Scott has made it clear on several occasions that he would attempt to block any dredging or filling operations, and also the construction of a bridge or ferry slips by refusing to issue permits for such activity.

So far, no requests for permits of this type have been submitted by the Carolina Cape Fear Corporation, and time is growing short on the Corporation's promise to provide a bridge to the Island by September 1, 1973.

IT is hard to imagine how Bald Head can be developed under the Carolina Cape Fear Corporation's plan without dredging and filling. Bald Head is actually a complex of small islands which are separated by marshes and winding, shallow creeks. Relatively speaking, there is very little high land, and the water around the islands and in the creeks is so shallow that access is difficult with anything larger than a skiff. The high land is broken into three parallel ridges largely separated by marsh and creeks. Throughout the marsh are small islands which lend their acreage to the total figure of 2,700 acres of high ground. There is virtually no way this high ground can be used without extensive dredging and filling of marshes.

Recently Governor Scott suggested that the only way for the state to aquire ownership of the Island would be by condemnation. Such action would bring the matter before the 1971 General Assembly. Henderson has agreed that the question of Bald Head's future should be placed in the hands of the legislators.

With the Bald Head issue in the hands of the General Assembly, perhaps the public will finally learn what the Carolina Cape Fear Corporation really plans for Bald Head.

The next step will be to find a better solution. ◆

Salt Water Record Fish — How Much Did the Fish Weigh?

by Mack McBryde
Division of Commercial and Sports Fisheries

THE Research and Development Section (Sports Fisheries Studies), Division of Commercial and Sports Fisheries, North Carolina Department of Conservation and Development, has compiled an excellent set of record salt water fish catches and we are adding to these records constantly. At present we have a **North Carolina All Tackle Record**, a **Test Line Record for Men**, and a **Test Line Record for Women**. In the test lines we recognize ten different tests, i.e. 12-pound, 20-pound, 30-pound, 40-pound, 50-pound, 60-pound, 80-pound, 90-pound, 100-pound, and 130-pound which includes salt water squidding lines, dacron braided lines, monofilament lines, squidding nylon lines and bait casting braided nylon lines.

Salt water lines include the following: squidding lines, dacron braided from Dupont polyester, dacron and nylon surf 'N squidding lines. An angler may purchase these lines in 12 different tests, i.e. 10-pound, 12-pound, 18-pound, 20-pound, 27-pound, 30-pound, 45-pound, 50-pound, 72-pound, 80-pound, 117-pound, and 130-pound. Even though these salt water lines come in line tests as stated above, the International Game Fish Association of Fort Lauderdale, Florida, only recognizes six different test classes for salt water.

With the advent of monofilament line, this created a problem in that an angler may purchase 14 different test lines plus the fact that bait casting line (nylon braided) includes 10 test lines. Therefore, due to the varieties of test lines on the market and the fact that many more tourists are now fishing along our coast with any one of 30 different test lines which are on the market, we (after some debate and consideration) decided to officially recognize 10 test lines in North Carolina.

Test lines in the 4-pound to 12-pound class are officially recognized as a 12-pound test line and the 14-pound to 20-pound test line, etc. In other words, any test line class used by an angler which falls between two official line classes, then the next highest line class is listed as the line used in making a fish catch. This does not preclude recognition of any outstanding record fish catch by IGFA but will give many more Tarheel salt water anglers the opportunity to be officially recognized by the state in the event they catch a record fish.

Any angler who is interested in a copy of North Carolina Record Fish Catches for 1970 may write Post Office Box 338, Division of Commercial and Sports Fisheries, North Carolina Department of Conservation and Development, Morehead City, N. C. 28557. You may also find these records posted at all marinas, ocean and sound piers, charter boats, head boats. etc.

ONE of our great heritages is the abundance and variety of fish off the coast of North Carolina. There are many salt water anglers who have, and will in the future, become dismayed, disappointed, and even downright angry after they find a record-size fish caught in the morning fell way short of its actual weight by late afternoon (this is due to dehydration). Or the fact that the record fish was not weighed-in at a station, i.e. marina, ocean pier, etc., and thus recorded—due to the angler's lack of knowledge of North Carolina's Sports Fishing Program in the Division of Commercial and Sports Fisheries, Department of Conservation and Development.

The angler will find a list of all record North Carolina salt water species on each charter boat, ocean pier, sound pier, family camp ground, and marina along our coast. These records make pretty good reading when the fishing is slow and also can cause some very interesting fish stories to come to light.

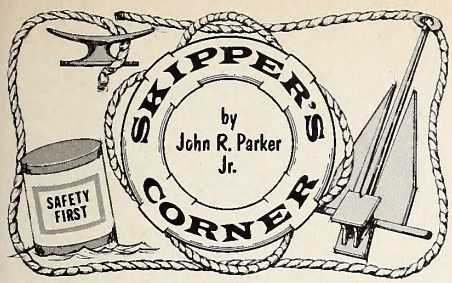
First, let's take the matter of dehydration. As much as ten percent of a large fish's weight is lost through evaporation over a number of hours and more especially so when the fish has lain in the sun most of the day. Even in the shade a fish will lose five percent of its body weight within eight hours. A very good idea is to keep the fish wetted down and covered with an old blanket or burlap sack, and if you know you have a record catch, head for the nearest weight station immediately.

What does an angler do when he is 25 to 65 miles offshore? The answer comes from Mr. Homer Circle, Fishing Editor, **Sports Afield** magazine. There is a formula that will give you the weight of any fish within a pound or two. All you need is a pencil, paper and a tape measure. **First,** let's take the fat type of fish like the bass (black fish, etc.). Use the formula $L \times G^2 \div 800$, where L is the length and G is the girth. Thus a bass which had a length of 20 inches and a girth of 16 inches should weigh approximately 6⅜ pounds; $20 \times (16 \times 16) = 20 \times 256 = 5{,}120 \div 800 = 6\frac{3}{8}$ pounds.

Second, let's look at the elongated type of fish, i.e., the pike, marlin, sail, etc. You take the same measurement of length and girth and use the same formula, but now divide by 1,000 and you come up with the weight within a pound or two. Both formulas are as accurate as stated above.

We have a Sports Fishing Program going and it would be nice to break as many of these records each year as possible; however, this can only be accomplished with the salt water sports angler's help. All outstanding records of game fish will help North Carolina become the best fishing area this side of the Bahama Islands (I'm not bragging, but it really is).

So, angler, preserve that record in cooperation with your charter boat captain, ocean pier operator, marina operator, sound pier operator; let's put North Carolina on the sports fishing map. ◆



IN the world of boating there is nothing so potentially disastrous as a man standing on the bow of a blazing 40 footer; unless of course, it is a man standing on the bow of an 18 footer, also ablaze,

With that bit of wisdom stowed away we can now say that a marine radiotelephone can be as useful aboard the smaller, small craft (especially if she is ablaze) as it is aboard cruisers, charter boats, etc. Like the proverb about another piece of safety equipment, the parachute, at times there just isn't any substitute. The compact and rugged marine radio of today can be installed on almost any boat having a 12-volt system (preferably with a charging capability), a dry place to mount the set and of course, a reasonably good location for the antenna. With little effort, antenna and set can be installed so as to permit the entire rig to be quickly detached and taken away from the dock with you.

In a dock-side question and answer session, let us now explore some marine radio basics.

Do I really need a radio?

As you know, it is difficult to place a monetary value on any piece of safety equipment that might be used to save a life or your entire rig, or may never be used at all. But if you venture out the ocean inlets, far into the large sounds, do night boating or go out on large water areas in winter or other periods when company is scarce, a radio will be mighty comforting. Safety, through ship to ship and ship to shore communications, boating information, fishing information, and weather information, comes with the package. And last but not least, the radio is a fun item but of course one to be respected. There are rules to be followed.

What type of help can I expect if I get in trouble?

Using a properly installed, properly functioning set you may rest assured your call for help will be answered or at least heard. There are approximately 14 Coast Guard stations monitoring marine radio emergency frequencies along the North Carolina coast. Most monitor continuously and most monitor both emergency frequencies, 2182 KHz and 156.8 MHz. Numerous boats plus marinas equipped with marine radio, add to this great safety network. Coast Guard stations stand ready to assist on a moment's notice and any boater worth his salt will assist either directly or indirectly.

Just what is available and how much will it cost me?

Manufacturers of marine radios are numerous. There are name brands and some equally as good that you may not know. There are imports as well as American made. Price will vary depending on power and number of channels. Thirty-five to 55 watts is popular in the medium frequency (MF) range which is, most commonly used today with 10-25 watts in the very high frequency (VHF) range being a good selection. [25 watts being maximum FCC allowed]. Figure $250.00 (minimum) installed on a good set. If you can be satisfied with a set that just meets FCC minimums and practical working minimums, you may save another 10-25 percent. From $250.00 you can easily go to $550.00 and on.

How much can I expect for maintenance?

This will depend somewhat on the care you give your unit. Above all else, keep it dry. Mount it solidly where spray or shipped water cannot get to it. Also, try to mount the set where there is little chance of a rod butt, boat hook or a big foot coming in contact with the front panel. The case should be wiped down with a cloth and fresh water after each exposure to salt air. There are numerous tricks to keep spray out, one of the simplest is to tape a piece of clear plastic across any portion subject to wetting. After a proper installation, and, subject to care given, you could figure something like 20 to 25 percent of the initial cost of the radio for lifetime maintenance. Locate a good radio man, preferably one who knows something of marine problems, and have your set checked at the beginning of each season.

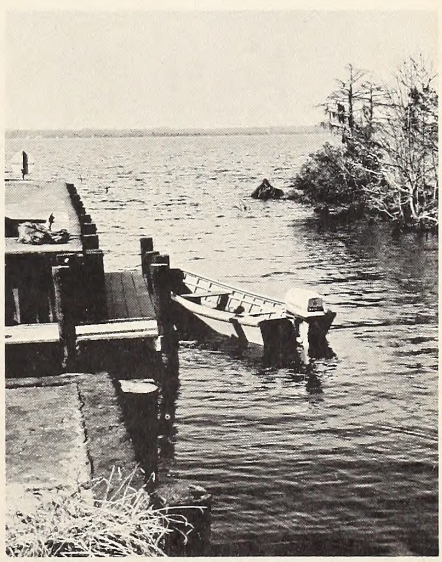
What should I know about proper installation?

Unless you are technically inclined and qualified your best bet here is to discuss installation with your marine dealer or someone with experience in the field and rely on what you learn from them. Your satisfaction with and service received from your radiotelephone will depend to a large extent upon the installation. Be sure the set is installed so as to be convenient to your use and care. Talk to others who own sets and let your installer know you want no short cuts.

What is this I hear about certain types of marine radios becoming obsolete in the future?

In order to clear up the long standing and acute traffic situation in marine radio communications, the FCC is now implementing a revolutionary plan.

Double-side Band Amplitude



The Wildlife Commission aids the boater and fishermen by providing free, public access to the major waters of the state. Won't you help by keeping these areas clean? Watch the speed around launching areas, too.

Modulated (DSB-AM) sets, the type used by 80 to 90 percent of the pleasure boat fleet today in the 2-4 MHz medium frequency band will no longer be licensed after January 1, 1972. (Actually, you could listen or receive but not transmit as it is what you put into the air waves that FCC regulates.)

After January 1, 1977, the DSB set may not be used. The FCC also approves (type accepts) what is manufactured. Since January 1, of this year, no new DSB sets have been accepted.

The switchover is said to affect some 170,000 units. Switch to what? The option is supposedly the best yet — VHF-FM — for boaters operating within approximately 30 miles of shore stations and Single-side Band plus VHF for certain other users, high seas, etc.

This means that you can still purchase, license, and install the standard marine DSB-AM set (until January 1, 1972). Depending on the area you boat in and your needs, this may still be best because you can use it until January 1, 1977, then you can use it as an anchor. In order to use the set until 1977, your station license, renewable every five years, must not be allowed to expire.

How might the change affect radio purchase today?

As mentioned you can use DSB, lifesaver of old, almost another six years. Depending on what you require of the set, you may get six years of perfect service. Of course, you can expect at times electrical interferences or static and high-use traffic in certain areas. But you can rest assured that if you call there will be someone to listen.

The Coast Guard, as mentioned, is monitoring the VHF emergency frequency, 156.8 MHz, as well as the MF frequency, 2182 KHz. This is of prime importance. When it comes to ship to ship communications, you may have to wait awhile for someone to talk to on VHF. But someone has to start. A few marine dealers tell me that they are starting to get questions about VHF and of course, the sets are available and prices have already come in line for small craft use. In other parts of the nation, the VHF move is in full swing.

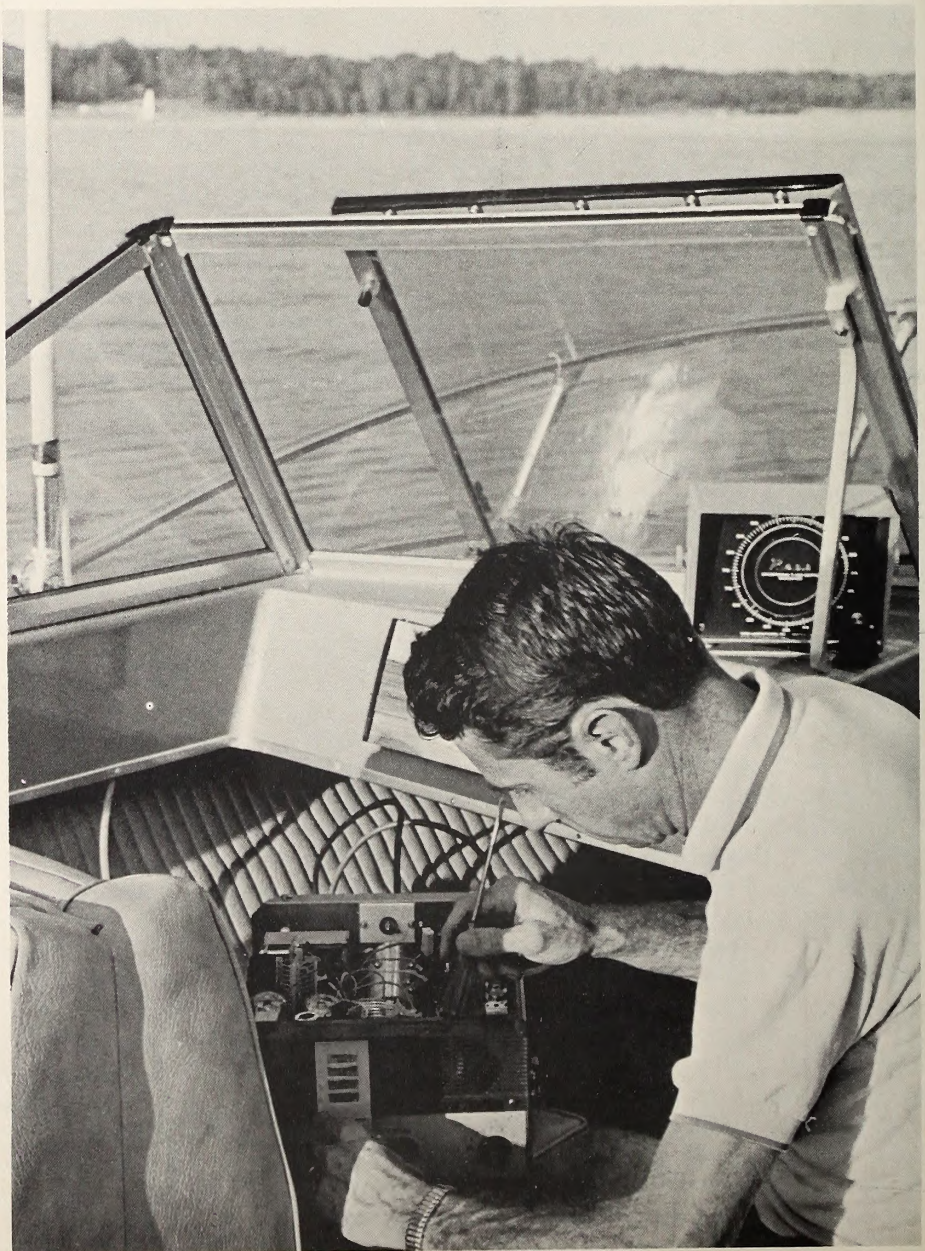
Are there other VHF advantages?

VHF is line of sight. The waves don't bounce all over the ocean and interfere with someone's conversation on the same channel 50 or 100 miles away. With VHF you talk to whom you need to within reasonable range. VHF-FM, at the frequency range in question, is virtually immune to all types of electrical interference. The set as a general rule can be smaller, power requirement is reduced, no ground plate is required, and the antenna is usually shorter. VHF offers more channels. On range, one authority suggest 5-20 miles for ship to ship and 15-50 for ship to shore depending on antenna height, primarily, and set wattage.

Manufacturers must have realized that the average owner of a small craft was not going to relish shelling out $500-$800 for a set with somewhat less range than a set he paid $250.00 (DSB)

Frank Plyler tunes the transmitter of the author's Simpson DSB marine radio. VHF sets suitable for small craft need not undergo this step, but any marine sets should be checked periodically by an experienced technician.

PHOTO BY JOHN R. PARKER, JR.



for a few years ago. They did find a way to slash prices. One manufacturer, for example, sells a handsome six-channel unit for $250.00, including four crystals, and antenna. Much cheaper than expected.

What about "CB" units on boats?

Highly advocated by CB buffs, these units are in fact used by numerous boaters. Big advantage is a cost half that of MF or VHF, small antenna, no operator's permit, (station license is required) and the same unit can be taken out of your boat and used at home or in your automobile. We are told many boat clubs subscribe to CB. Small inexpensive sets are also handy on cruises, inland lakes, etc. Power allowed by FCC is low, five watts, but there is a safety factor, most certainly in that they are so numerous someone *might* hear your call. But *might* is the key word. Here are some officially recognized drawbacks with CB for general marine use: the U. S. Coast Guard does not monitor CB frequencies, no emergency broadcasts, short range, no restrictions on type of station in service, channel crowding, no interference protection and no channel to a marine operator for land phone connection.

What is involved in licensing any type marine set?

Basically, licensing is simple, but relatively expensive. You fill out FCC Form 502 regarding citizenship, radio use, boat name, etc., and send this along with $20.00 to Federal Communications Commission, Gettysburg, Pennsylvania 17325.

Some marine dealers or radio dealers will have the forms; if not, order them from the above address or from FCC, Norfolk, Virginia. You will also need to acquire an operator's permit. This again is of very little trouble but expensive. Fill out Form 573 which is an application for a Restricted Radiotelephone Operator's Permit. Send it along with $8.00 to FCC in Gettysburg.

After installation and prior to use, your set must be checked for proper functioning and so signed by a licensed radio technician. Your marine dealer will tell you who has been doing this work for his customers, if not available at his shop.

Say you are going to your marina right now, to pick one out? Don't forget to make your selection of optional channels, be sure the set meets all FCC requirements in the first place, make sure the set is properly installed, licensed and that your operator's permit is on board.

Well now, you don't just pick up the mike and start yakking. There are rules and regulations all spelled out in literature available from FCC. In fact, the FCC has a special form entitled "Official Notice of Violation." But it's not really all that monstrous. This marvelous piece of safety equipment can be fun and will add to your boating enjoyment. Treat it with respect and here's hoping that the ominous words—Mayday, Mayday—Mayday may never have to be spoken into your mike.

Editor's Note:

Grateful appreciation is extended to Frank Plyler, District Service Administrator for the Mobile Radio Department of the GE Company, Raleigh, N. C., for his assistance in preparing this article.

Gasoline Warning

DO NOT OPERATE OUTBOARDS WITH NEW "LEAD-FREE" OR "NO-LEAD" GASOLINE INCLUDING LEAD-FREE GASOLINES WHICH NOW HAVE PHOSPHORUS ADDITIVES.

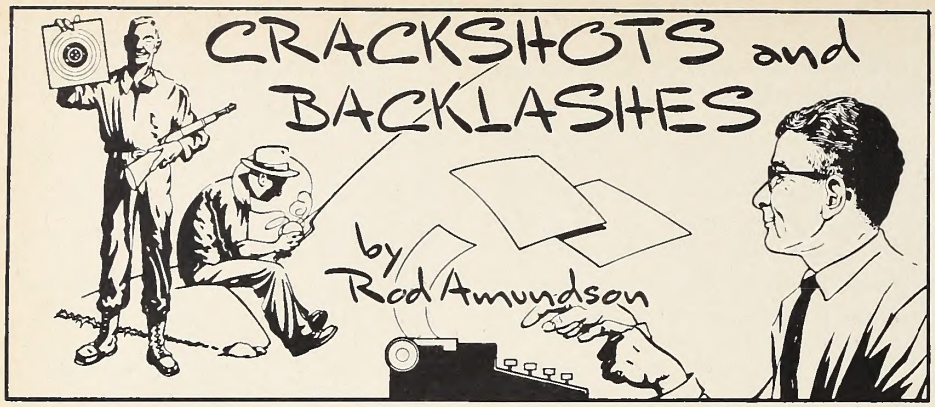
Piston failure may occur from the use of phosphorus additives which replace tetra-ethyl-lead. Regular leaded and low-lead fuels are satisfactory.

Some oil companies for many years have manufactured high-grade, lead-free fuels which contain no phosphorus and are designed for use in two-cycle engines, either directly or as premixed. Such fuels, if known to be of good quality, may continue to be used.

Mercury says: "Disregard instructions in your Owner's Operation and Maintenance Manual regarding the use of new "lead-free" automotive gasolines." These instructions were written before the oil companies decided to place phosphorus into the new lead-free fuels. It is useful in four-cycle engines, but damaging in two-cycles. ◆

The boating public would be the first to form the flight against pollution, but until further notice from manufacturers, outboarders had best stand clear of non-lead or low-lead fuels with phosphorus additives.

EVINRUDE MOTORS PHOTO



A Trip to Sylva

A brilliant morning was ours as we left Biltmore Forest and turned west on I-40. We were bound for Sylva to spend Thanksgiving Day with parents, and after the confusion of departure, my spirits soared to see the beauty of the hills around us. As we approached the cloverleaf, we could see the familiar grey cloud of Enka trying to blot out the sun, and though my spirits dampened a little at the sight, I expected to get by the grey pall quickly on the superb new road. On this particular day, however, Enka's blight lay like a sodden blanket over the entire length of the valley until it mingled with the grey stench above Canton. If the mushroom cloud means doom to the mind of man, Champion's proliferation gives a clear warning.

The cloud thinned as we neared Waynesville only to be replaced by a not quite so deadly looking mixture of fumes and smoke from Unagusta and Dayco, and finally, Sylva's own child, the Mead Corporation. From miles away we could see the thick grey mist hanging low over the pocket in which the little town sits. I wondered if my father-in-law still suffered from nosebleeds.

As we neared his home, I saw an ugly red gash of raw earth sprawling crookedly not ten feet from the side of the house. A front-end loader scraped back and forth.

"The Sylva by-pass," my husband reminded. "I guess they're on penalty."

As we entered the driveway we stopped to view the scar that had been a rose garden and ancient, billowing boxwoods. The loader continued its scraping and strafing and the operator puffed on his cigarette and looked aimlessly about. Beyond him several men stood around or hammered unrythmically on the bridge. We went inside to escape the noise.

Thank heavens, things were still the same inside. The fragrance of hot bread met us, and the old cook gave me a warm glance and the recipe for her time-honored turkey dressing. Screaming and laughing from the four year old as she bounced on the old man's legs, a football game on television, a hot hickory fire, apples in the garage, an old leather rocking-chair and good companionship, the kind that springs only from long association, made up for the morning's trip. A delicious meal was capped by poetry learned in school and recited by the children as dessert was served, "Turkey Talk" by the boy, "The Mayflower Ship" by the four year old, and a special birthday poem by a ten year old to her grandfather whose eyes gleamed with delight as she finished. The loader had stopped work, and the solid walls of the house blotted out the sound of the hammering.

As the old folks settled down for a nap and my husband dozed in the chair by the fire, my mind raced back over the morning's trip and the specter of the new road cutting through the cove near the house. Where will it end, I wondered. Are we so steeped in the American philosophy of progress that we are trading all peace of mind for truck-routes, cardboard packaging, and nylon stockings? Are we so dollar oriented that we will continue to rape the earth until the last man chokes at the wheel? Where are our senses? We have gone mad to take, take from the earth all she'll give without once stopping to put back, to contain, to conserve. Undaunted, we race headlong to our own doom like lemmings toward the sea.

I walked up the road into Grindstaff Cove where the by-pass originates and saw there a great pink trough in the side of the hills as large as ten city blocks, and there, too, men and machinery ground out the day's dollar sending black puffs of smoke and ear-shattering noises into the quiet hills. A farmhouse, its lovely construction. An old lady came out and told me that "they" took her golden delicious apple trees and boxwoods and didn't even use that portion of land. She didn't seem as unhappy as I felt inside to see it. My dog poked in the rutted mud tracks of the pans and I threw a stick into the slime.

Mrs. Thomas Ferguson
Asheville

"Old Baldy"

In reference to the "Old Baldy" inquiry I would like to comment as follows:

A bald cardinal, especially amidst a flurry of juncos, looks for all the world like a prince of the church surrounded by lesser clergy. During this "eight ball" phase our proud redbird is not likely to win any beauty contests nor is he a rarity. We have had one on our feeders several years in succession and two of our neighbors, none near enough to involve the same bird, have made similar observations.

The suggested causes, like army fatigues, don't fit too well. Pesticides are not being used within miles of our wooded area and since the birds seem to be permanent residents it is unlikely that they got whatever it is, elsewhere. The available diet of which at times as many as six male and five female cardinals partook, never affected more than one bird. Old age seems equally unlikely unless we assume that only males get that old, because the "baldies" were invariably males.

KNOW YOUR PROTECTOR

William S. Warren

Wildlife Protector William S. Warren, stationed at Ernul in Craven County has been employed by the North Carolina Wildlife Resources Commission for six years. He is the son of Mr. and Mrs. J. G. Warren of Chocowinity, North Carolina. He graduated from Chocowinity High School, and attended Wilson County Technical Institute and North Carolina State University. Prior to employment by the North Carolina Wildlife Resources Commission he was engaged in farming.

William completed the Basic School for Wildlife Protectors at the Institute of Government at Chapel Hill, North Carolina, in 1964. He was employed as a wildlife protector trainee in October 1964 and stationed at Windsor. In December 1965 he was appointed wildlife protector and assigned to Craven County. Since his initial employment, William has completed four In-service Training Schools.

Mr. Warren is a radiological monitoring instructor and a National Rifle Association hunter safety instructor; member of the New Bern Toastmaster Club; Southeastern Game and Fish Commissioners, Law Enforcement Section; North Carolina Law Enforcement Officer's Association; Craven County Law Enforcement Officer's Association; and North Carolina 4-H Honor Club. His hobbies are gunsmithing and quail hunting.

William is married to the former Carol Lewis of Chocowinity, North Carolina, and they have two children; Tracy Brian, age 5 and Zina Ann, age 3. The Warren family are members of the Free Will Baptist Church.

This, equally flimsy, circumstance leads me to the hesitant surmise that their tender topknot may have been damaged by butting it endlessly against a window pane while combatting an imagined rival.

I do not think the loss is due to worrying over the price of sunflower seeds (that's *my* excuse!) nor do I recommend putting a bottle of "Wildroot" on the feeder.

Rudolf G. Hosse
Hendersonville

Water Hole

Dear Sir:

I have a couple questions to ask that have me puzzled. After visiting Long Beach, North Carolina on different occasions and knowing this is an island and seeing no fresh water streams or ponds, where do the area's Wildlife get their fresh water?

Some, like the newly-hatched baby quail I saw one time, cannot fly very far to get to water. Squirrels and bobcats, rabbits and deer must have fresh water to live.

The other question I have to ask is where do the sea gulls go at night? Especially, this time of year when the nights are cool.

Your assistance in these problems would be greatly appreciated. Also I would like to say that I thoroughly enjoy reading your magazine "Wildlife in North Carolina".

Paul W. Anderson, Jr.
Salisbury

Dear Mr. Anderson:

Long Beach does have a few springs and also some rainwater ponds which provide drinking water for many species of wildlife. In addition, the river which runs between the Island and the mainland is slightly brackish, but of sufficient quality to provide drinking water for the larger game, such as deer, wildcats, and foxes. As for quail, rabbits, and squirrels, these rarely require fresh water. They do drink dewdrops and raindrops, but get most of their moisture from the foods they eat, known technically as the water of metabolism. As for gulls, their nighttime habits vary according to species and circumstances. Some spend the night in large flocks by simply floating on sounds and on the ocean during calm weather much in the manner of ducks and geese; others roost on sandbars at low tide.

Rod Amundson, Chief
Division of Education

Thank You

My Dear Sponsor:

I have thankfully received a magazine which you so kindly sent me. I'm fond of this magazine very much. How are you getting along? I think of you very often.

I am keeping very well here in school. Teachers care me very much and the classmates are very kind too. My studies are not bad, please do not worry about me. I always enjoy your magazines very much.

Wishing you in good health.

Your sponsored child,
Tsang Kin Keung
Christian Children Fund Inc.
Chung To School
Hong Kong

Mr. and Mrs. Elvin Scheer, Chapel Hill, send our magazine to this school on a regular basis, and hear frequently from the children there.—Ed.

Drainage and Flooding

Evidence from the U.S. Geological Survey's gaging station on the Minnesota River at Mankato shows that drainage of wetlands has increased flooding on the river considerably, according to the Wildlife Management Institute. Data show that the number of floods increased 40 percent after drainage. The maximum flood flows increased 73 percent and the maximum flood stages increased 74 percent.

The Geological Survey's report was given as an evaluation of engineering plans for a ditch which would drain some 1,200 acres of wetlands into the Minnesota River. Minnesota's Division of Waters, Soils, and Min-

erals calculated that if those 1200 acres of wetlands temporarily stored only four inches of water when a rain produced ¾ inches of runoff, they would reduce flood flows by 33 percent.

The engineer's justification for the ditch was that the land was needed for the production of food. This is questionable in that the two counties involved have 74,633 acres of land retired from crop production under federal farm programs.

Fish Book

The second edition of the popular booklet, "Some North Carolina Fresh-Water Fishes", is now available from the State Museum of Natural History. A total of thirty-nine fishes are treated in the book, with thirty-six of these illustrated in full color. For your copy, send 40 cents in coin, to Fish Book, State Museum, Box 2281, Raleigh, N. C. 27602.

"Baffling Birds"

At least one bird shown in Milton Jordan's article *Those Baffling Birds* in last month's magazine baffled the cutline writer. The oyster catcher on page 9 is a black skimmer, says John Parker, Jr., who should know; a pet skimmer nipped a finger of his once upon a time. Apologies to author Jordan, and photographer Knickerbocker, both of whom are blameless.

Just Reward

Recently named Conservationist of the Year by the National Wildlife Federation was Jim Morrison, Jr. of Atlanta, Georgia. As Chief of the Georgia Game and Fish Department's Information Section from 1963 until 1970, Morrison waged a relentless battle against fish and wildlife destruction by stream channelization in his state . . . losing his job as a result! Would that more of us had your guts, Jim.

This photo snapped during a January waterfowl aerial survey, revealed one of Nature's tragedies. A deer had either been chased or unknowingly ventured onto the ice of Hyco Lake, and apparently broke through at once. Without man's power of reasoning or any deer luck, the animal's endurance served only to churn the ice of the winter-bound lake until the end finally came.

Early Nester

Dear Sir:

I saw something Saturday, January 9, 1971 that I had never heard of before, possibly you can enlighten me on this.

Saturday morning while the trees were still full of ice, I saw what I thought was a crippled Dove hopping along beside my home. I kept watching out the window and presently it hopped up on a rose trellis and stayed quite a while, and then another Dove came down and fed the one I thought was crippled.

I kept watching during the day and discovered there were two young Doves on the ground being fed and looked after by a pair of old Doves, and this kept up through Sunday the 10th when the young ones managed to fly in a small tree.

Have you ever heard of Doves raising in the middle of the winter?

E. A. Brooks
Charlotte

New officers elected by the Wildlife Resources Commission at its January meeting are: Chairman, Dr. Lathan T. Moose, Winston-Salem (center); Vice-chairman, Orville L. Woodhouse (right) Grandy; Secretary, Robert G. Sanders, Charlotte.

Fontana Roundup 1971

By David C. Coxe
Raleigh, N. C.

Shortly before the turn of the century, the United States received a unique gift from the country of Egypt. The year was 1880 and the gift was one of two large obelisks erected to an Egyptian ruler maned Thutmose III over 3000 years earlier.

This 69 foot high monument was called Cleopatra's Needle. It was presented to the city of New York and was placed in Central Park. The writings on the stone are called hieroglyphics and were well defined and clear at the time. Now, some 90 years later the corrosive air of this great city had done more destruction to the stone than 3000 years of weathering in the ancient land of the Pharaohs.

If you find that hard to believe, just try a fifteen minute ride from the airport to town with the windows down. The eyes have it, and in my one-man roll call, the nose had it too. Well, so much for a play on words. Most of us know what the problems are. More of us want to know what is being done to overcome them. That is what Fontana is all about.

The 12th annual Fontana Conservation Roundup will convene May 13 at Fontana Village, North Carolina. This quiet resort is located in the southern edge of the Great Smoky Mountains National Park in the western portion of the state. It is two miles from Fontana Dam which is the largest in the TVA system. Sporting 300 cottages and a 56 room lodge, it is the ideal setting for both business and pleasure. The village is located on highway 28, between Federal highways 19 and 129.

Environment is always a key point of discussion at these conferences, and this year is no exception. The theme for 1971 will be BALANCING RESOURCE USE AND ENVIRONMENTAL QUALITY. The moderator will be Mr. Forrest V. Durand of the Bureau of Outdoor Recreation, Southeastern Region, Atlanta, Georgia.

Acceptances have been received from Mr. Daniel A. Poole, President of the Wildlife Institute; Dr. William E. Reifsnyder of Yale University; Dr. Lois Sharpe, League of Women Voters; Mr. Donald M. McSween, Director of State Parks and Recreation, South Carolina Department of Parks; Mr. Robert F. Gibbs, Project Coordinator, South Florida Environmental Project, U. S. Department of the Interior, and Mr. David A. Adams of the Coastal Zone Resources Corporation. The Honorable Henry M. Jackson, senator from the state of Washington will be the featured banquet speaker on Friday night, May 14th.

More than 200 conservationists from eight states have participated yearly in an effort to gain better knowledge and understanding of our declining environment. Most of them are professionals, many are laymen. All are tops in their fields and all are sincerely dedicated to the task of putting things right.

I remember one speaker who two years ago was concerned about the attitude lag toward conservation. He indicated that public indifference had continued too long. All who attended were in complete agreement. As I reflect upon the turn around that has taken place since then, I have no trouble answering people when they ask, "what happens at this conference?" We all came together as thinkers. We left as doers.

For those of you who would like to make the trip part of your vacation, it is the perfect opportunity. The special rates for housing and the added attractions offered by the Executive Committee will please the pocketbook of all.

Make your plans now to attend the 1971 Fontana Conservation Roundup May 13th and 14th. Reservations may be made direct to Mr. O. A. Fetch, Resident Manager, Fontana Village Resort, Fontana Dam, N. C. 28733. You'll be glad you did. ◆

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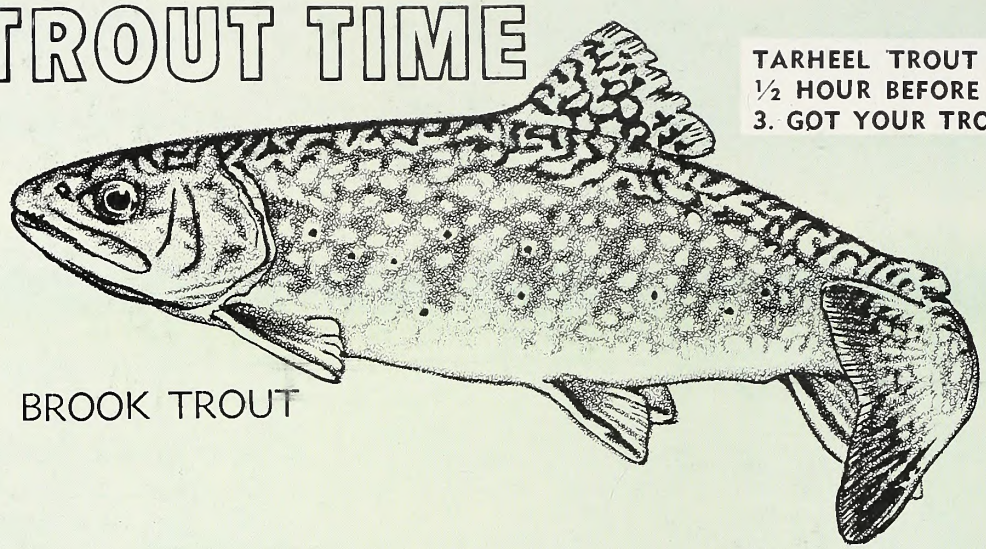

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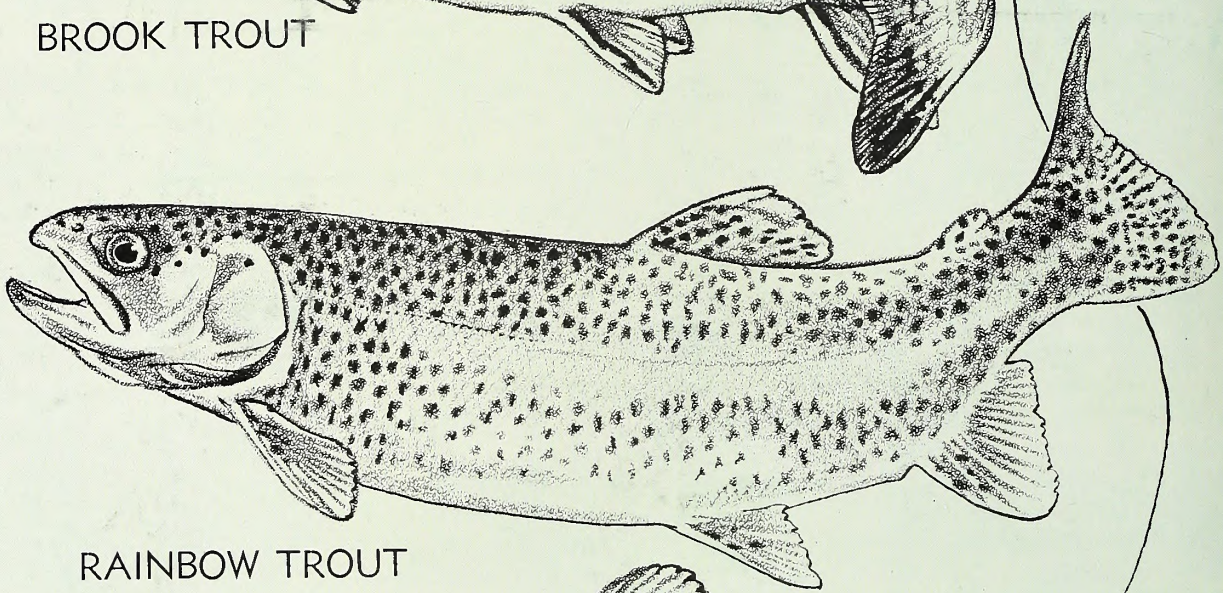

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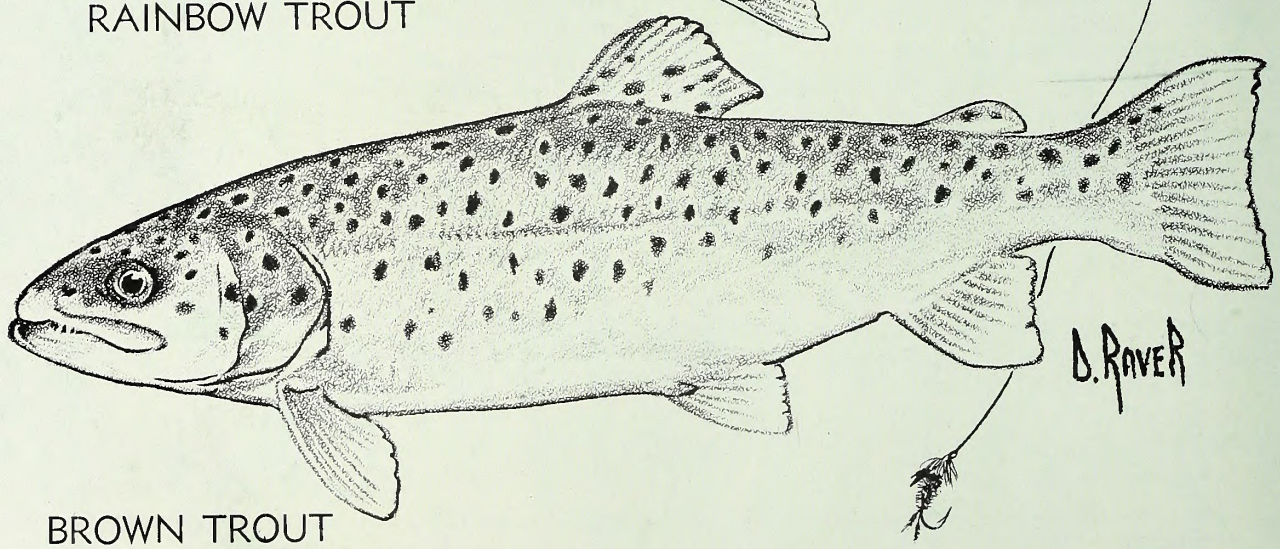

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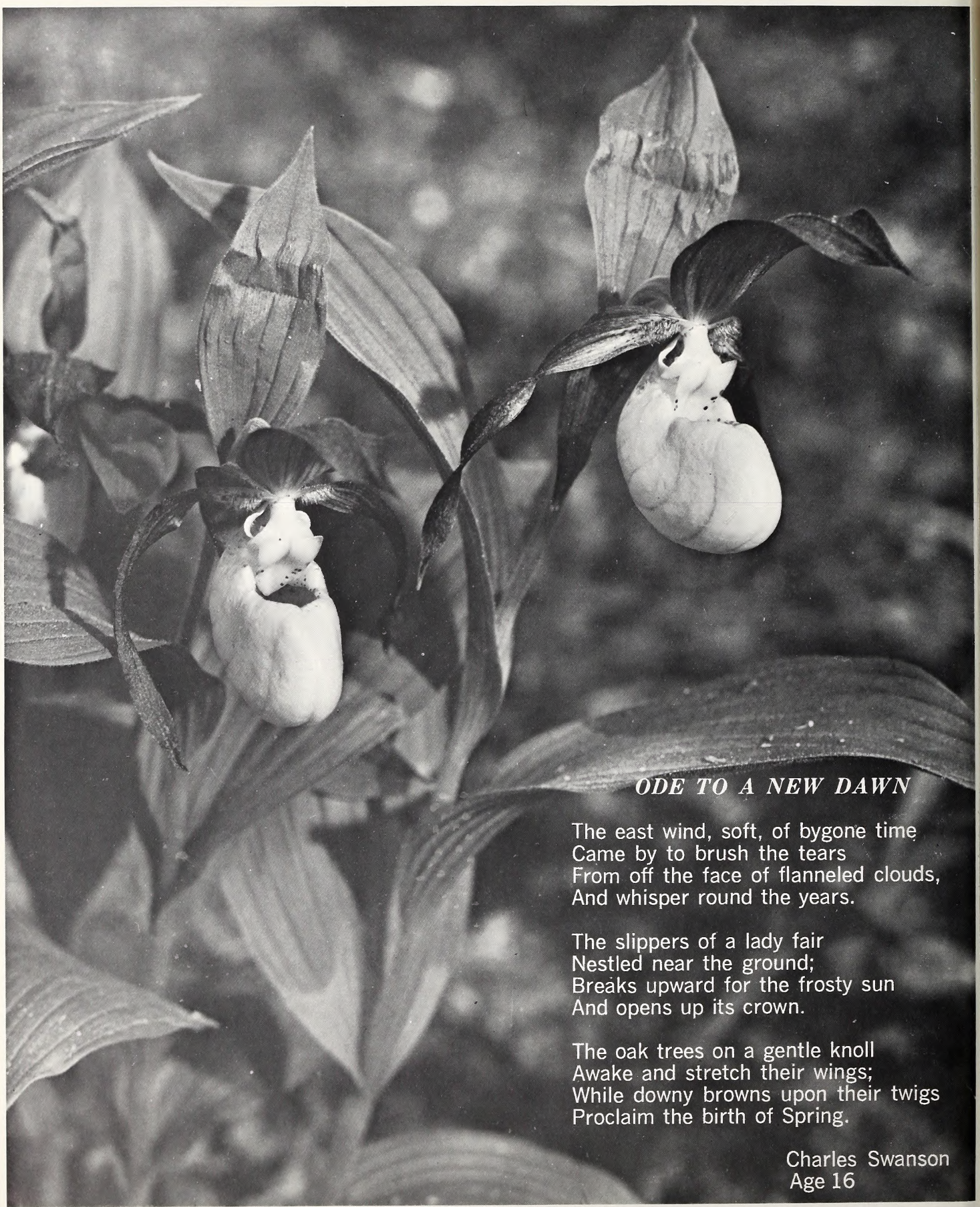

ODE TO A NEW DAWN

The east wind, soft, of bygone time
Came by to brush the tears
From off the face of flanneled clouds,
And whisper round the years.

The slippers of a lady fair
Nestled near the ground;
Breaks upward for the frosty sun
And opens up its crown.

The oak trees on a gentle knoll
Awake and stretch their wings;
While downy browns upon their twigs
Proclaim the birth of Spring.

Charles Swanson
Age 16

YELLOW LADY'S SLIPPER

PHOTO BY JOEL ARRINGTON

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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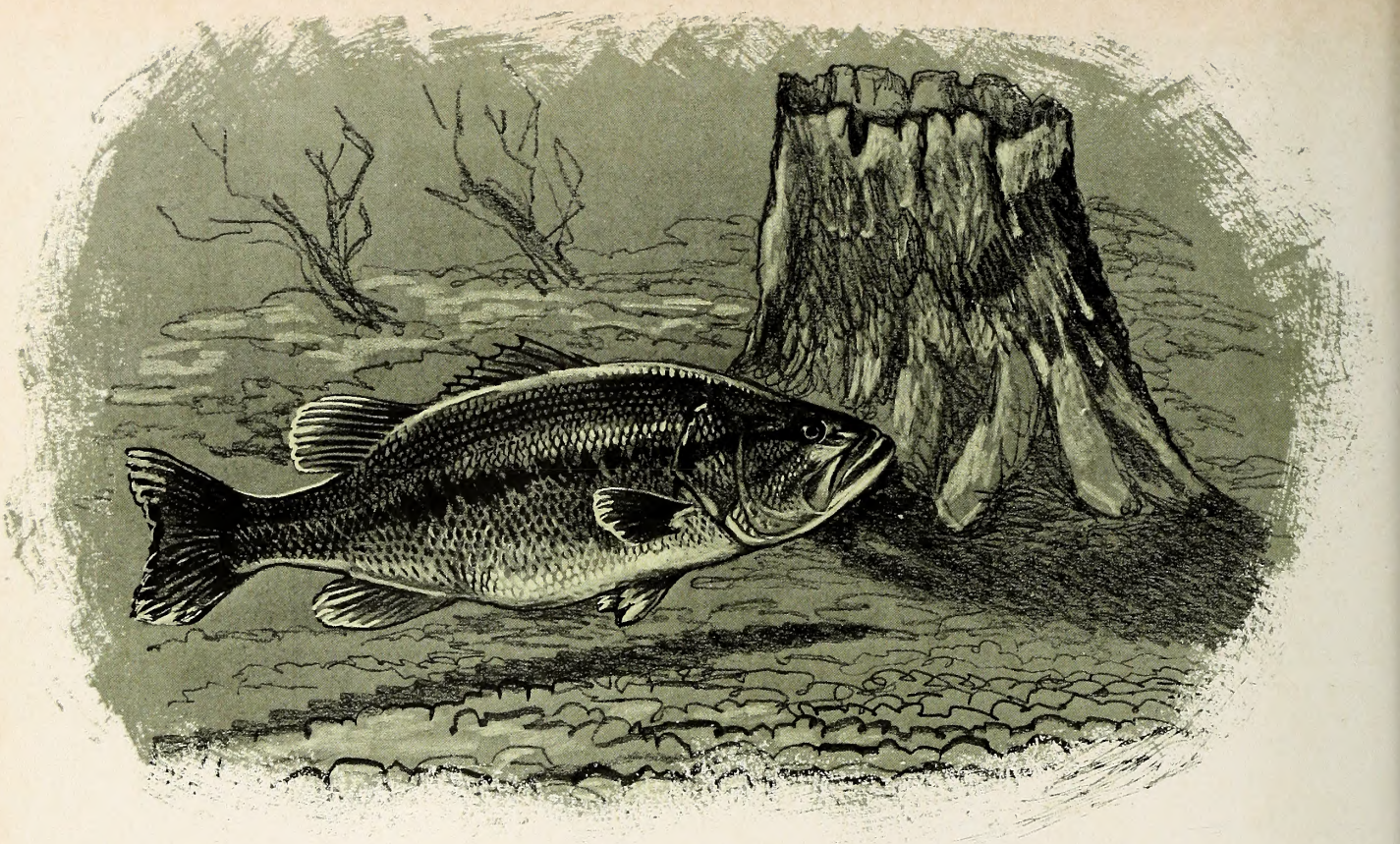
By mid or late May, the downy young of the red-shouldered hawk are inspecting their new world. This woodland hawk is a year-round resident in much of the State, and a winter visitor to our mountains. It feeds along woodland streams and its food is primarily frogs, snakes and great quantities of rats and mice. Only about 10 percent of the diet is birds. All hawks and owls are protected by law. Painting by Al Kocan.



So Long, Back Creek

by Mike Gaddis
Raleigh
ILLUSTRATIONS BY DUANE RAVER

THE big fish swam up out of the creek channel through an old tree lap and toward the base of an age-wrinkled stump which lay some 18 inches under the water. This was a familiar place to her. Some seven years before, at the age of three, she had reached sexual maturity. Every spring since this had been her bedding place. Her time was rapidly approaching once more.

It was early May and for several weeks a warming sun had gradually elevated water temperatures in the shallower areas of the lake so that now these same waters acted as an attractant and a triggering mechanism for both ripening males and roe-laden females.

This big female was responding both to the phenotypic beckoning of the season and the physiological demands of her body, which had nutured the growing egg mass since September of the fall before. Age was collecting its toll. This would be her last spawn. Her once supple and muscular body was now sagging and fatty. Fins once transparent and full were now opaque and ragged. The bottom of her tail was a bloody pulp from helping the male fish sweep clear the bed.

She was a giant of the species, *Micropterus salmoides,* the Largemouth Bass. Carrying the developed egg mass her total body weight would tip the scales a little more than midway between 13 and 14 pounds. The odds which had allowed her to reach this size and age were astonishingly small. In her birth year some fifteen thousand progeny were produced by the spawn, of which she was but one. Her first act of survival was to elude the cannibalism of her own parents.

Then in the ten years which had followed, there were the natural controls, the ones limiting the average life-span of a largemouth to something on the order of six years. Predators: piscivorous, reptilian, and mammalian; the physical phenomenon —oxygen depletion; silt so heavy that it eroded the delicate mucoid surface of the gills so that finally oxygen intake was rendered impossible.

And man, always man. Twice during her life she had narrowly escaped death at the hands of an angler. Once, in her early years, she had yielded to the temptation of a well-manipulated surface lure, but had managed to throw it on the second frantic jump. And only last year she had fallen

for a teasing, trebled deep-runner while cruising the cool creek channel one late afternoon in July. She had been hooked well, her only salvation from the stinging hooks the submerged tree she was able to reach. She had put all her strength into that run and the line had parted as it slid over a ragged limb. After much gaping and headshaking the clinging hooks were dislodged. She was now an extremely wary fish, having seen others of her kind fall to various methods since that time.

Indeed, of the approximately fifteen thousand embryos which had hatched in her birth group only a minute percentage had miraculously survived to reach this tenth year. And out of that percentage she was actually a freak. Only an abnormal growth potential could have allowed her weight and proportions in nine seasons, taking into consideration the geographical location of the body of water which sustained her.

As she approached the base of the stump a male bass of around two pounds swam quickly to meet her. Mildly receptive the female moved slowly onward and stopped only upon reaching a marked depression in the graveled lake bottom some 30 inches in diameter. For the past seven seasons this had been her spawning bed; before that it had been the place of genesis for many others of her tribe. It had been fanned and nosed clean by the male as in so many years before so that the clean gravel would provide ready attachment for the adhesive eggs to come.

Here the male began to make advances, bumping and brushing the abdomen of his large mate. Her relative size dwarfed him. Fins flaring, the frenzied male became more aggressive. Beginning to respond the heavy female rolled and swirled. At the surface in front of the weathered stump the water bulged into a disruptive boil followed by heavy, radiating, concentric rings.

MILT Thornburg had lived near Back Creek most all his life. For the last 17 of his 72 years he had fished this lake exclusively. Before that it had been a hodge-podge of small ponds. His entire angling life had been spent in this small geographical area. He had grown up in an era of limited mobility and since the little town, until recently, had changed only slightly since the turn of the century it was a part of his life. Just as well.

For although he had never fished the waters of the Santee-Cooper one state away, plugged the "hayfields" of Florida's Lake Okeechobee, or the lily pads and huge cypress of the St. Johns, he had probably taken more out-sized bass than the majority of anglers who had spent years in the pursuit of trophy fish from such reputed waters. Among the knowledgeable members of the local angling fraternity his reputation as a master bass fisherman had no equal.

Equally admirable he was a sportsman, a descriptive noun a lot of outdoor men never earn.

The yellowed pages pasted on the weathered walls of the Back Creek boathouse stood as mute testimony of the man's ability. For 12 years Randall Emory, the lake caretaker, had kept a record of all bass over three pounds to come out of the lake. In not one of these years had the name Thornburg been associated with less than 40 fish and the vast majority of these exceeded five pounds as the old gentleman commonly returned anything under that for "seed". His largest bass had been caught six years earlier, a respectable fish of eleven-and-a-quarter pounds, and a lake record.

May the eighth of this year began for Milt Thornburg much the same as other May mornings had begun in other years. Randall was waiting at his usual spot alongside the worn path leading to the place Milt kept the weathered juniper johnboat that had been meticulously handcrafted during the winter months some 12 years before.

"Mornin' Milt."

"Randall."

"Ain't seen you in a spell." Randall ended his sentence in a questionary tone.

"Just don't seem to have the get-up-and-go I once did," Milt replied. "Guess we're both gettin' a little too far over the hill for comfort, huh?"

"Charlie's boy was out here the other day. Came back in with a tolerable string o' bream and a trout a couple-a-ounces shy of eight pounds. I'se downright proud of 'im."

Milt noted with humored interest that Randall still used the vintage deep South word "trout" for "bass". "Sounds like he's taking after his old man all right. That's good to hear. Where'd he catch the trout?" That last word still came easy for him too.

"Up Mosers Branch run somewhere. Probably on th' edge of th' creek channel; they been beddin' right heavy in there lately."

Out of the corner of his eye Milt noticed that the sky above the pines on the point to the immediate east was beginning to show a little pink. He started to make a parting remark to his old friend but was beaten to it by an impertinent voice from the direction of the boat dock which demanded explanation as to where some fish could be caught.

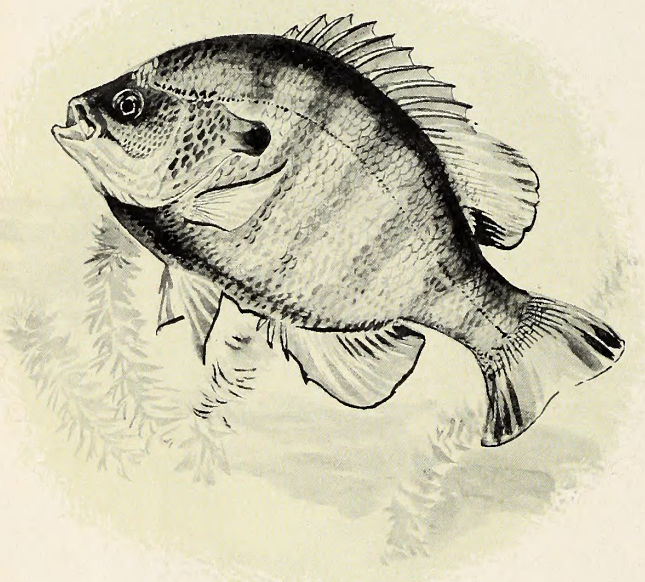
"Hope you get 'im," Randall said as he turned to leave.

HAVING arranged tackle and himself in the little juniper, the old man paddled slowly past the recently constructed boat dock, then sculled the boat leisurely along the edge of the lake, enjoying the sights and sounds of daybreak and mildly shivering against a slight chill and the rising fog which would be ushered away shortly by a warming sun. Enjoying, and remembering, for it seemed that kind of day too, and he was in that kind of mood. His thin, sinewy forearm seemed to tire much more readily this morning than ever before. He could remember when he could scull a boat the entire length of Back Creek in the black two hours before day when he was duck huntin' and

had to push it to make it to the blind on time. But those days had long passed. An arthritic knee sternly reminded him of that. No, he was old and growing ever more feeble. No one was more kneely aware of that than himself.

He even allowed himself to speculate that this might be his last spring on Back Creek. The thought was depressing. He loved this lake, and love was the correct word. He didn't like what was happening to it.

Up until five years before Randall Emory had owned and caretaken Back Creek Lake, a family heritage, exclusively. Randall had never required any monetary payment for fishing the lake, just his hard-won consent, fisherman's courtesy, and maybe an occasional yearling bass or a mess of "copperheads", blue-black bluegills so dubbed because of a bright, copper-colored crest. So in by-



gone days there had always been a tightly-knit group of seven, each a long-time friend of Randall's and each an expert bass fisherman in his own right. Competition had always been keen but not one of the group would conceive of digressing upon the fishing rights of another.

Tom was a past-master at top-water. You couldn't beat Eck at baitfishin'. Therman was perfection with a fly rod. Charlie swore by a boxfull of River Runts. Stanton wasn't above a little conscientious jigging on a pitch black night and several mornings the others had met him as they walked to their boats at daybreak, grinning his toothiest where-were-you-last-night grin and trying hard to hold his stringer high enough to keep the tail of the largest bass from dragging the ground.

But six years earlier the last of them had died an old man, leaving only him behind.

Then Randall began having trouble with people from the larger city to the east. The fishing population there had outgrown the local city reservoirs and drove for miles around the surrounding area searching for more remote fishing. Back Creek was too big and too productive to remain virgin.

To Milt they represented a new breed of fishermen for the most part, boisterous, ill-mannered, hap-hazard and with no true love of the sport nor intention of preserving it for the enjoyment of generations to follow. Asking permission to fish was a bother to most and Randall was constantly trying to keep them from over-running a lake which had been in his family for over five decades.

The rich man from the city had come shortly afterwards. They said Randall was offered a goodly sum for the lake and the adjoining property. Apparently so, for Emory had accepted with the stipulation that he be allowed to stay and maintain the place. Milt had first considered this to be an act of betrayal, but he couldn't really condemn a man who was down. He knew that Randall had suffered financially during his wife's extended sickness over the two years preceding the transaction. And the old man had apologized privately to him for what had to be a necessary action on several different occasions.

A year ago a new boat dock had been built and boats put in for public use. The waters of Back Creek, prior to that, had never been disturbed by the churning propeller of an outboard. But that was past history too.

The latter fact was emphasized by a boat speeding past full throttle, its operator not attempting to slow or give berth to the paddling angler. Milt cursed and dug the paddle in deeper as the heavy wake threatened to swamp the little john. He hadn't recognized the fellow which was a good thing. Matter-of-fact the frequency of his trips to the lake had decreased since it had become public and he knew none of these latter-day fishermen. Nor cared to he thought to himself. Likely they thought of him as an eccentric old antique which came pretty close to being the cherished truth, the way he figured it.

The old man paddled steadily for the next quarter-hour, pausing only upon reaching the neck of the lake Green Branch flowed into. From this point he proceeded cautiously, easing to within 40 feet of the place he knew the twisting creek channel coursed through an old oak lap which bordered a large, worn, and pitted stump. He knew the set-up offered an ideal bedding area for large bass; in the past it always had, and in recent years for one particular fish. He watched and waited.

He hadn't been there long when the water in front of the stump bulged into a heavy swirl. It left little doubt that there was a heavy bass under it. Some seventh sense warned Milt that this was no ordinary fish. During the two previous springs when the sun was high he had seen a bedding bass in this same place which he felt was larger than anything he'd ever caught before, or even had on for that matter.

On both occasions he had pitted the experience gleaned from years of angling against the fish. The first year in his nervousness he thumbed the reel a little too much causing the plug to drop short and land directly over the bed, and the fish had vacated the spot with an immense wake. He remembered with a half-hearted chuckle the lecture he had given himself for pulling such an elementary stunt. Why any beginner—!

Infinite patience and his most seductive manipulation of a battered darter elicited a swirl the second year but that had been the extent of things. After bedding season he had fished the creek channel, bottom-pumping a deep-diver among the many stumps. One sweltry afternoon in late July he had hung a heavy bass near the spot at which the old oak lap canopied the channel. But before he was even able to see the fish he had known once again the nauseating, hollow sensation of losing a really good fish. After all the years such an occurrence still left him trembling. Under an unrelenting run the bass had managed to reach an underwater obstruction of some sort, most likely a tree lap. The rod had relaxed as the line parted.

MILT had expected to find the big fish here this morning. He'd passed up several other good places which would probably have produced good bass in order to reach his present location while early morning conditions prevailed. He'd been rewarded and although this particular fish was an awful long ways from being in the boat no man could ask for more than a chance.

Gingerly he picked up the paddle and slipped it into the water. Slowly and gently he manuevered the responding boat into a position conducive to a perfect cast. It had to be this way; there would be no second chance on this fish. Choosing a spot as a target some six feet to the rear of the stump he executed a careful cast. Thumbing the spool gently caused the wooden darter to placidly dimple the water. Even so the old man held his breath for fear the tempered splash would spook the bass. His fears were dispelled as the water in front of the stump bulged again. He could just make out her bulk in the dingy water and couldn't help but notice in the same instant that he was shaking.

The last ring had died away a full minute before the old man twitched the plug the first time. The lure nodded slightly; just an attention-getter. It still lay some three feet behind. Deftly the rod tip moved and the wooden minnow darted with a purr to the right, floated slowly back to the surface, and then flashed to the left.

It had not been an easy morning for the female bass. For an hour or so a school of large shiners had been trading back and forth across the bedding area and she and the male fish were ill from having to constantly chase them away. So it was natural that she mistook the wooden darter for an intruding minnow.

The plug was being presented in the right manner, at the right place, and at the right time. It was as simple and difficult as that. Skill was taking a definite part but luck was certainly playing a complementary role. Her patience was exhausted.

It was not a slashing strike but deliberate and typical of a large fish. When the lure darted over her head she inhaled it.

It took an instant and the pressure of the fish for Milt to realize what had happened. One second the plug had been there and the next only a suckhole remained. He reacted simultaneously, bringing the rod tip back and to the side with a sharp, quick snap. To meet solid resistance was gratifying.

The sudden jolting restraint and the uncomfortable feel of the lure sent the bass into a frenzy. The natural reaction was an attempt to escape by any means possible. Bottom silt was churned into a muddy streak as she left the bedding area and every muscle of her body was fighting to reach the tree lap which bordered the channel.

On top, the old man was putting all the pressure on the line he possibly dared, realizing what the fish had in mind. The run was unrelenting, forcing a split-second decision. If the reel was thumbed to a halt, the line might break; if not, then undoubtedly the bass would reach the tree limbs and break the line there. Either was a gamble. The fish was heavy and the fisherman elected the latter in the remote hope that the outcome would somehow be in his favor. A massive tail fanned powerful strokes and the big fish bored through the limbs. It might have been over if luck hadn't intervened. The line caught for a few seconds, stretching under the strain of the powerful bass; then the rotting black limbs broke and fell away.

Her first choice had failed and now the second run, almost as heavy as the first, was carrying her deep to the rooty bottom of the creek channel. She succeeded in wrapping the line but the root was almost vertical and frantic thrashing in the opposite direction vetoed the momentary advantage.

STEADY pressure was telling. Slowly the massive body was weakening. Her runs were no longer long or unstoppable. She was being drawn steadily toward the top. Suddenly she turned and raced for the surface as if aware it was her last chance.

Milt reeled frantically, trying desperately to catch up with the fish. And watched with heart in throat and a silent prayer that the hooks would hold as the massive head of the largest bass he could ever remember having on cleared the water in bulldog attempt at dislodging the plug. Hooks rattled and the lure flapped violently but the effort was in vain. Two more times the fish churned the surface with the same result. On the last attempt the tiring, weighty body provided only the strength for a sluggish roll beside the boat. In that same instant the fish saw the man for the first time and with the strength that could be mustered into a run tried vainly to escape.

Milt could remember losing many good fish in such a last minute maneuver. With such a short length of line between rod tip and a heavy fish it was not overly difficult to allow the rod to straighten in line with the run exerting too much pressure on hooks lodged precariously in a torn mouth. Or else to have a stray hook to imbed in the boat if the run was in that direction, allowing the fish to tear free. These thoughts crossed his mind as he cautiously fought to stay in control. Gradually increasing pressure on the spool rolled the huge bass over as her endurance gave out, and she lay spent on her side. The old man eased a thumb into the massive mouth and ponderously lifted the heavy fish over the gunwale.

For the first time, after what had seemed like an endless fight, Milt could relax. His immediate emotion was one of elation, gratitude, and pride. He was surveying what was easily the largest bass he had ever caught and the largest ever taken from Back Creek. But gradually the elation melted and pride was swallowed to be replaced by compassion of a depth he had never known before. Suddenly it was immensely significant that failing old man had taken a huge and failing bass from a dying lake, all three having outlived their times. This had been his lifelong goal, he argued, but his inner self stood unconvinced; it just wasn't as he thought it would be.

If this had happened in his younger years it probably would have been different, but now it marked the end of an era. To take this particular fish seemed tragic. Somehow it repesented the death blow to a lake he had loved since the first morning he saw it.. It had always been a part of him and he felt a part of it.

He reached to return the fish to the water but realized at the same time that it was too late. Tears swelled as he watched the eye twitch and color change characteristic of a dying fish.

For Milt the trip back to the boathouse was a long and thoughtful one. It traversed virtually every day he had ever spent on Back Creek. Mostly he remembered the late afternoons. If one hour had to be singled out of a summer day's fishing it had to be the one before dusk. When the fading sun hung precariously on the tree tops and the dying golden rays melted into the soft greens of the vegetation, finally flowing down to be reflected against the blue water of the lake. Growing shadows began to put a little starch back into a sweltry, liquid day and the cooling air felt good against your face. Sometimes Mrs. Varner, who lived on the south side of the lake, played hymns on the organ this time of day, and during such times he reckoned he came about as close to knowing God as he ever would.

And then dark would fall and you'd line the bow of the boat up with the lantern Randall always hung outside the boathouse and paddle in. If there was a good fish on the stringer then you felt doubly good because the rest would always be waiting to see what you brought in.

The last thought sank in and Milt suddenly realized that they wouldn't be there tonight, tonight of all nights. If there could be just one more reunion! The day and the event were too much to be hoarded selfishly by him alone.

Randall Emory clucked softly as he lifted the huge bass from the scales which had just registered thirteen pounds and nine ounces and handed it back to his old friend. Emory was plainly happy; no one more deserved this fish than Thornburg. But as he handed the fish back he suddenly read the pain in his friend's eyes. That quickly he understood and felt his own face flush and tears welling in his eyes.

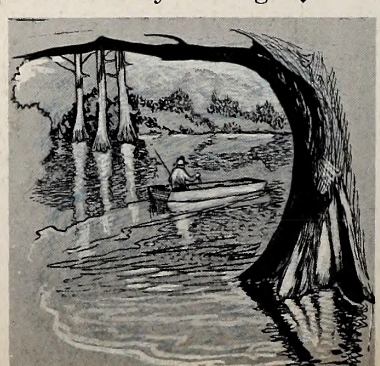
"I'm glad you got 'im Milt. You were overdue," he managed to say, almost inaudibly.

THE old man took the fish and walked over to the sheet of notebook paper taped to the wall of the boathouse. With a trembling hand he recorded in the left margin 13 lbs. 9 oz.; in the right he scribbled seven names: Tom, Eck, Stanton, Charlie, Therman, Alvin, and last of all, his own. Then he picked up their fish and left, oblivious to the excited exclamations of the crowd that had gathered.

Milt fished Back Creek two or three times more before November took hold but every trip seemed anti-climactic. Not because he had caught a very big bass but mainly because the world was so radically changed from what he had always known. Life itself seemed somewhat anti-climactic.

The winter that ended the year was bitter and the next spring was late in coming. It found Randall Emory gathering his belongings from the weathered boathouse which was due to be torn down during the summer and replaced by one of concrete and block. Two months earlier he had been to old man Milt Thornburg's funeral. It was held in the cathedral of pines that fringed Green Branch. From distant green boughs the nesting doves had seemed to join in a mournful farewell. Last week he had quit as caretaker of Back Creek.

His lake had lost its identity and he along with it. He was a relic, out of step with both the times and the surroundings. He was tired of wet-nursing people with newly-bought boats who hadn't been taught bow from stern. He was tired of talking to people he had to talk up to. As he climbed the hill above the boathouse a flashy runabout left the dock, its powerful outboard gutterally whining as it strained to plane the boat under the weight of two boisterous water skiers. The sound was brash, foreign, and immensely boring. ◆



FISHED OUT

by Dr. R. Wharton Gaul
Charlotte

THERE weren't any fish left in that creek. Or so it seemed. After all, when you spend several hours casting flies on a beautiful mountain stream and never raise a single fish, something must be wrong. That boy up the road said the wormers had stripped it, and whatever they left had been taken by some dynamiters. At first I didn't believe him. Surely nobody would be stupid enough to dynamite Designated Trout Water. But maybe he was right. Here it was, three o'clock on a warm June afternoon, with a gentle breeze blowing from the southwest, water cold and clear, and a few flies drifting up from the surface. And not a fish in sight. I kept at it another hour and then quit. Tomorrow would be another day.

During the night a cool front passed, bringing with it a few showers. I had to work the next morning but noon saw me hard at it again. The water was just a trifle roiled from the showers but still beautiful. The air was clear and cool. An occasional large greyish mayfly, **Isonychia bicolor,** better known as the Leadwing Coachman, would float through the air near me. I walked about a half mile up the old trail, stashed a cold can of beer in the water and went to work. But it was yesterday all over again. I did surprise one rainbow of 12 to 13 inches in length, feeding in the shallows, but he had no interest in my offerings. The afternoon wore on and my temper wore thin. Finally at 4:30 I was ready to head in. There's a big pool near the lower end of this creek, which we will call Turtlerock Creek, because that is not its name. The shadows were lengthening across this pool as I passed. One more cast wouldn't hurt. I was still rigged, so it took only a moment to flip my fly, a bushy Light Cahill, over a submerged rock. A streak of silver shot out from beneath the rock, cleared the water and missed my fly by inches. I was completely stunned. Nervous hands retrieved the line, leader and fly. I stood still a few minutes drying the fly and then floated it over the rock again. Nothing. A few false casts and another float. Out he came again and this time he didn't miss. He took the fly with a splash and turned, setting the hook before I could react. There was nothing artistic about this fight. He wanted off and he didn't care who knew it. But the hook was well embedded and the clinch knot held. After about 90 seconds I was able to beach him on the rocky shore where I stood. Maybe that doesn't sound like a long time, but if you will watch the second hand on your wristwatch that long and imagine a 10-inch rainbow going wild in a pool the size of your living room, you will see what I mean. It's a long time. This was a gorgeous plump fish with a brilliant stripe. Maybe he had a girl friend.

Replacing the bedraggled Cahill with one of Lee Wulff's concoctions, I tossed it to the head of the pool where the upstream riffle poured between two boulders. Something rose and splashed slightly ahead of it but no take. Several more casts produced nothing. A small rise occurred near the tail of the pool but again no fish. It seemed time to rest the water. I explored the riffles and runs above the pool but it was too overgrown for any real fishing. Returning to the pool, I recalled something that all the outstanding writers on fishing, from Gordon to Bergman to Haig-Brown, have mentioned, namely if you want to catch fish in hard-fished waters, try approaching your spot from an angle others have neglected. With this in mind, I slipped into the lowest part of the pool, eased across through thigh-deep water and emerged on the opposite brushy shore. From here it was possible to wade about ten feet towards the head of the pool. Between the judicious use of the roll cast and the long line, it would be possible to cover the entire pool from this one spot. By now the sun was behind the ridges. A rise took place not ten feet from me, and slowly a minor hatch of pale cream mayflies, **Stenonema canadense,** began to take place. Oddly enough, the Light Cahill I had taken my fish on was the correct fly, although no duns were visible earlier. Several more surface disturbances appeared around the pool but nothing touched my fly. It dawned on me that maybe these fish were nymph-

• **continued on page 27**

Environmental Quality— What It Means To Me

This is the first-place winner in the 1971 North Carolina Wildlife Federation essay contest. Miss Muldrow is a student at Bishop McGuinness High School in Winston-Salem.

by Sylvia Muldrow

WHAT is the environment? According to the definition of Webster's New World Dictionary, it is all the conditions, circumstances, and influences surrounding and affecting the development of an organism.

Now, what is quality? Again according to Mister Webster, quality is the degree of excellence which a thing possesses. To illustrate, on some mornings while driving along I-40 on the way to school, I look out over Winston-Salem and see a murky, grayish black cloud hanging over the skyscrapers and factory stacks. On the other side of the expressway, both lanes are jammed with cars, trucks, and exhaust fumes. All along the road lie trash and litter in the form of cans, bottles, junked cars, and paper. Unknowingly with each breath I inhale fly ash, sulphur dioxide, Strontium-90, bits of brake lining from cars and a host of other impurities. All of these are conditions and circumstances which affect me, because I am an organism, and this is my environment.

But does the quality of my environment show excellence? Certainly not, for my environment has nothing to show but the man-made woe of pollution. Pollution plays no favorites. It spreads its smog, trash, and junk over, around, and under all mankind. The health of the environment has real meaning because the surface of the earth is truly a living organism. But because of pollution, our planet is well on its way to developing an inhospitable atmosphere for man and all other living organisms.

We are in the middle of an environmental crisis, created mostly by citizens of America, which has been described as a nation knee-deep in garbage, firing rockets to the moon. We human beings exist and enjoy life only by virtue of the conditions created and maintained by microbes, plants, and animals that convert matter into a highly integrated living structure. Any profound disturbance in the ecological balance is a threat to the maintenance of human life as we know it. The mind is affected by environmental factors just as much as the body. Its expressions can be distorted by the surroundings in which it develops and by the hostile stimuli to which it has to respond.

The generation in which we are living, and of which I will be one of the fruit, has been exposed from birth to conditions that will be the roots of maladaptive responses and organic disease. But why has the quality of the environment reached such a low standard? The increase in the world population is one of the determinants of the ecological crisis. But few persons realize that the dangers posed by over-population are more grave and more immediate in the United States than in less industrialized countries.

Each U. S. citizen uses more of the world's natural resources than any other human being and destroys them more rapidly, thus contributing to the pollution of the earth, the moon, and space. American cities give the impression of being more crowded because they expose their inhabitants to much unwelcome stimuli. Incidentally, the mechanical expressions of our time also help to push us farther apart.

There are many other factors contributing to the general degeneration of our environment. All power pollutes. Coal and oil produce smoke and sulfur dioxide. Hydroelectric power requires dams that cover up land, spoil wide rivers, and increase water loss. Nuclear power plants produce radioactive pollution. We are often told that it is essential to increase the amount of energy in order to meet the demand that maintains our "standard of living." We are constantly battered by advertisers to buy appliances, gadgets, and new cars which increase the use of power. The consumer must limit this pressure, and decide which appliances are really necessary. If this happens, the advertisers will not produce what they cannot sell, thus power usage will be limited.

One of the most devastating effects of this eco-catastrophe of which we are in the midst takes the form of air pollution. An analysis of New York City's atmosphere concluded that a New Yorker on the street takes into his lungs the equivalent in toxic materials of thirty-eight cigarettes a day. According to a calculation based on an 18-month survey done by the Air Quality Control Department

here in Winston-Salem, the people of Forsyth County are breathing the equivalent of ninety-two rail carloads of assorted airborne garbage each year.

Air pollution in America is so varied and complex that scientists have only begun to scratch the surface. It differs from city to city and is determined by weather, the industries nearby, the number of automobiles and trucks, and topography. Air pollution comes from three basic sources: combustion, industry, and nature.

Combustion sources are those where fuel is burned to produce heat and power, or where waste is burned to reduce its volume. Industrial sources involve such processes as crushing, grinding, baking, and evaporating. Natural sources embody volcanoes, trees which emit terpenes, lightning storms which create ozone, and even oceans which emit minute salt particles into the air. But the top villain in this orgy of destruction is the great god of American culture, the Private Automobile.

The automobile and the American public are locked in a life-and-death struggle. The car is robbing the American people of their land, air, minds, and their very lives. Automobiles insulate man from his environment and from human contacts. Sixty percent of all pollutants in U. S. air come from the internal combustion engine. Lead is one of the most pernicious of all pollutants emitted by the automobile. People with more than about 0.5 parts per million lead in their blood show visible signs of lead poisoning, constipation, headaches, paralysis, blindness—death occurs at higher levels. The average city dweller in the United States now has 0.17 parts per million of lead in his blood. One half of the 200 million cars in the world are in the United States, and in 1967 motor vehicles in the U. S. consumed 80 billion gallons of fuel.

We are rapidly depleting the world's resources of fossil fuel all in the name of progress. Americans can do a lot to remedy these problems by buying small efficient model cars, patronizing local public transportation facilities which use less gasoline, walk, ride bicycles under distances of five miles, and thereby be informed about the environment.

The earth is not running out of water because the hydrologic cycle (evaporation, condensation, and precipitation) keeps the amount constant. But the earth is running out of useful water because it is being swamped by man and his technology. Dust, hydrocarbons, and radioactive particles enter our water when rain washes them out of the atmosphere. Insecticides and fertilizer salts are washed from the soil by rain. Other pollutants enter our water from storm sewers and industrial plants. Oil from boats, ships, and drilling operations steal air and food from sea and land creatures which had the first right to it. Again this problem of killing animals can be stopped by decreasing the use of the automobile, thus reducing the need for oil drilling.

The major causes of land pollution are erosion, the clearing, mining and paving of land, the widespread use of chemical pesticides, and the accumulation of municipal and industrial wastes. The effects of land pollution are unsightliness, loss of valuable topsoil for food production, destruction of wildlife, and rat infestations. Ways in which individuals can help are by not littering, by pressing for legislation that limits the use of pesticides, by learning how to convert vegetable wastes into fertilizer, by not junking cars.

One aspect of pollution which is neglected by the public is the increasing problem of putting more and more chemicals into our foods. These chemicals which are called additives include dyes, bleaches, flavor enhancers, conditioners, acidifiers, deodorants, emulsifiers, and many others.

Why use chemicals in our food? When large cities came into existence, food products had to be shipped long distances and kept from spoiling. The demand for diet foods and the popularity of pre-cooked foods were also decisive factors. The weakness in consumers for good looks and good taste leads to the addition of chemicals that produce these effects. It is however, not definite whether these chemicals are harmful in the food we eat. But, like other forms of pollution, if accumulated in our bodies over a long period of exposure they could cause death. Ways in which to reduce the intake of chemicals are to cut down on the use of pre-cooked foods, serve carefully washed fresh fruits and vegetables, drink natural beverages, cook fresh unprocessed meats, and trim off excess fat from animal meats since DDT and other pesticides concentrate in the fat of animals.

It is now evident and infallible that the conditions and circumstances affecting my development rate low on the quality scale. It also seems that the very roots and basic ideas of our materialistic, technological, good-time society disrupt the code of nature. There are some things I can do individually to help. But according to William A. Curby, a Boston biophysicist, a cloud of dirty air hangs over the U. S. east coast down to Cuba, and even if all pollution stopped now it might remain there forever. This makes one destined to breathe filth for the rest of his life, and the fate of man's ecological doom inevitable. But if everyone tries hard to turn destiny, the quality of our environment will guarantee to this generation and future ones life, real happiness, health, good land, pure water, and fresh air. ◆

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NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Big Fishing Tournaments

The Tarheel "Great Lakes," Kerr Reservoir, Gaston, and Roanoke Rapids Reservoir, will be the sites for two mammoth fishing tournaments coming up soon. The First Annual Northeastern North Carolina Rock and Bass Fishing Tournament will get underway at 5 A.M. May 22, and close at 5 P.M. May 23. Fishing will be permitted in Lake Gaston, Roanoke Rapids Lake, and the Roanoke River to Halifax. Entry fee is $5.00 and the prizes are fantastic boat-motor-trailer outfits, plus many others well worth trying for. For an application and further information write: Fishing Tournament, Roanoke Rapids Area Chamber of Commerce, P. O. Box 519, Roanoke Rapids, N. C. 27870.

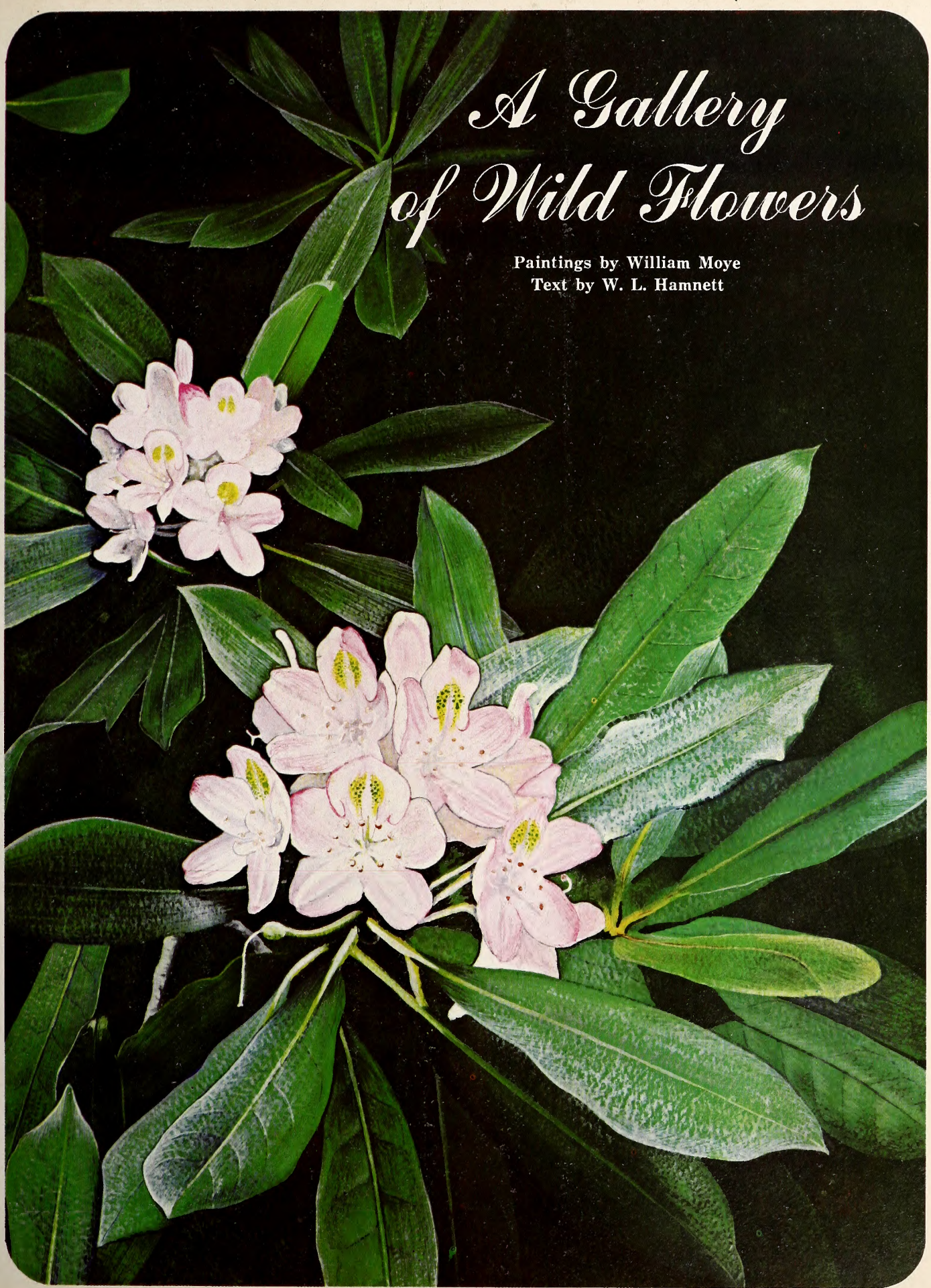
And then comes the 2nd Annual N. C. and Virginia Kerr Lake Bass and Rock Fishing Tournament to be held on June 5 and 6. The entry fee is $7.00 and fishing is limited to the bountiful waters of Kerr Reservoir. For each category, rock fish and black bass, the first prizes include boat, 20 hp. outboard, and trailer, plus a trophy. This tournament is sponsored by the Henderson Jaycees, and entry blanks and other information available by writing: Fishing Tournament, Henderson Jaycees, P. O. Box 197, Henderson, N. C. 27536. Who will be the Tarheel Bass Champ this year?

Don't Forget the Hunting Regulations Public Hearings

May 4, 1971	District 9	Sylva	Courthouse	7:30 p.m.
May 5, 1971	District 8	Morganton	Western Piedmont Community College	7:30 p.m.
May 6, 1971	District 7	Yadkinville	Courthouse	7:30 p.m.
May 7, 1971	District 6	Albemarle	Courthouse	7:30 p.m.
May 10, 1971	District 5	Graham	Courthouse	7:30 p.m.
May 11, 1971	District 4	Elizabethtown	Courthouse	7:30 p.m.
May 12, 1971	District 3	Rocky Mount	City Court Room	7:30 p.m.
May 13, 1971	District 2	New Bern	City Hall	7:30 p.m.
May 14, 1971	District 1	Edenton	Courthouse	7:30 p.m.

Safe Boating Urged

The boating season is in full swing on Tarheel waters, and skippers are reminded of their responsibility in keeping our waterways safe. Be sure your craft meets all legal and safety requirements before you launch your craft. Check your newspapers for courtesy boat inspections ashore, conducted by the Wildlife Commission.



A Gallery of Wild Flowers

Paintings by William Moye
Text by W. L. Hamnett

Rhododendron

A Gallery of Wild Flowers

Laurel

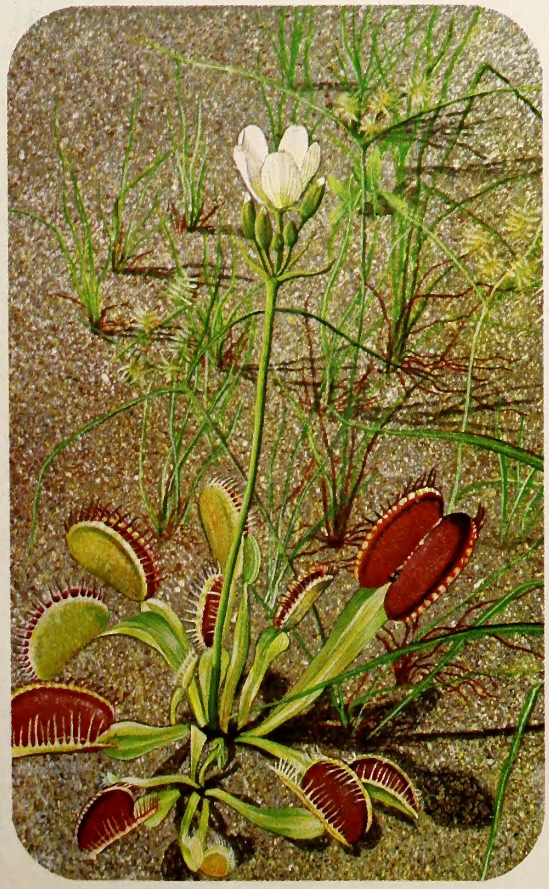
May Apple

Hepatica

Bloodroot

Cardinal Flower

Venus's Flytrap



Rhododendron:

This rhododendron is one of the delightful native shrubs of western North Carolina when in the perfection of its loveliness. It is in July that the waxy flower-clusters of the *rose tree* are in their fullness of beauty. This shrub alternates a year of bloom with a year of growth. It grows along streams in cool forests in our lower mountains and Piedmont.

Mountain Laurel:

A list of the most attractive shrubs in our woodlands would surely include mountain laurel, with its polk-a-dot flowers waving in the breezes of May and June. This plant, as well as the rhododendron, should not be tasted or chewed—just left to be pretty. The retention of the anther in a little pouch of the corolla makes this flower a most interesting one to observe.

Hepatica:

People at one time believed that Nature indicated in some fashion the uses to which her creations might be applied. And so it has been with this liver-shaped leaf of the hepatica, used in concoctions for liver complaints. The lavender colored flowers may be seen blooming in late February or early March while snow is on the ground. This plant deserves protection from unnecessary picking.

Venus's Flytrap:

Even as one of the world's unique plants, Venus's flytrap is also limited in its range. It is seen only in the coastal area of the Carolinas. Fortunately, this is one plant that is protected by an Act of the General Assembly (1951). In May one can easily locate the plant, as he can then see the attractive white flowers at the end of the tall stalk. It grows best in open sun in moist savannahs.

May Apple:

When the green leaves of the May Apple unfold in the spring, one could say, "The umbrellas are up". Like so many plants, this one too was sought by people because of its medicinal qualities, but proved to be poisonous if used in an excessive manner. The waxy flower will not appear on a plant which has only a stalk with one leaf. You don't necessarily have to wait until May to see the plant in bloom in our woods and moist meadows throughout the state.

Bloodroot:

Bloodroot simply means just that—the poisonous rhizome has a bright red-orange sap. The white, spotless, showy flower is borne directly on the underground stem. A person is foolish to pick this flower for a bouquet because within a few minutes after it is plucked, the petals fall off. This fragile, early spring flower of the upland woods is wrapped in a curled cylinder of the leaf as both emerge from the earth.

Cardinal Flower:

Few plants exhibit the vivid color that this flower does. In late summer its brilliant red is quite conspicuous in open meadows and along stream banks in scattered localities throughout our state. This plant should receive protection from promiscuous collectors at all times.

About the Artist

William S. Moye is a native of Hickory, and is presently a biology major at Davidson College. He has attended the Governor's School in Winston-Salem, and is a recipient of a National Science Foundation scholarship for study in biology.

Bill achieves meticulous detail and accuracy in his paintings but not at the sacrifice of pleasing design, grace and beauty. He is a devoted student of that which he pictures. "I've spent all my life within memory on one side or another of 'The Creek'," he says. "I am always there or somewhere near it . . . at least in the back of my mind. If I can't be there physically, I think of it half consciously . . . even dream about it nights," Moye continues. "This creek and the forest around it have done as much to influence my development as any other single identifiable thing in the whole history of my environment. I approached it from the very beginning with a sense of awe and wonder . . ."

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For information about Mr. Moye's original paintings, contact Mr. or Mrs. James A. Mosher, International Contemporary Arts, 4208 Henderson Road, Greensboro, N. C. 27410.

Guides to North Carolina Flowers and Trees

by Robert H. Morrison
Charlotte

THE planet has again tilted North Carolina into the Spring, and a profusion of wild flowers are blooming and getting ready to bloom across the state.

By a recent count made at the Department of Botany at Chapel Hill there are 2,945 species of native flowering plants within our boundaries.

Although everyone can identify a few wild flowers, no one can identify all of them without resorting to a manual.

Unquestionably best book ever written on the subject of identifying North Carolina native plants is the "Manual of the Vascular Flora of the Carolinas." It was published in 1968 by the University of North Carolina Press. It was written by Botany Professors Albert E. Radford, Harry E. Ahles, and C. Richie Bell. But you may not find it useful. Let Dr. Ahles explain on page 1034: "T. officinale Wiggers, Common D. Leaves deeply pinnatisect to barely lobed, 5-40 cm long, 1.5-7 cm wide. Nutlets olive-brown. (n=12) . . ." (Dr. Ahles is describing a dandelion.)

This year there is renewed concern for understanding and preserving our natural environment, of which wild plants are an essential part, and you may want to get a book and start identifying. It's a rewarding experience, and everywhere in the state there is an abundance of plants to identify.

The most complete popular account ever published on American wild flowers is "Wild Flowers of the United States" written and edited by a staff of writers at the New York Botanical Garden under a grant made by Mr. and Mrs. David Rockefeller. The photography is unexcelled. The work is multivolumed, there being two volumes covering flowers found in North Carolina, and each volume has two separately bound parts. The price for the four books is $84.00 and they are too bulky to be carried in the field. However, they are a source of final reference and are available in many public libraries.

There are also a number of large, lavishly illustrated American wild flower books, such as "Wild Flowers of America" edited by H. W. Rickett, featuring water colors by Mary Vaux Walcott. Such books, though beautiful, are designed for the coffee table—not the field.

The best guide to the wild flowers of Northeastern United States is "A Field Guide to Wildflowers" by Roger Tory Peterson, published by Houghton Mifflin Company in 1968. This very complete guide, handy to carry and costing only $4.95, is very useful in the North Carolina mountains and Piedmont. (One must remember that the kingdom of flowers does not recognize our state's boundaries, and many plants that are abundant in remote Canada also thrive very well atop Tar Heel mountains, and many plants found around Wilmington and on Bald Head Island may be most numerous in Florida.) Peterson's guide features illustrations rather than photographs, and at first thought it may seem that photographs would be better, but good pen drawings are often the simplest means to identification.

Because there is a companion volume called "A Field Guide to Trees and Shrubs" by George A. Petrides, Peterson's guide purposely does not describe flowering shrubs and trees, although many of the most spectacularly beautiful wild flowers in North Carolina appear on trees and woody perennials. (The tulip poplar and rhododendrons are good examples.)

So "Trees of the South" by Charlotte Hilton Green should not be overlooked. This important guide, published in 1939 by the University of North Carolina Press, has been a favorite through the years. A newer and somewhat more technical and complete book is "Guide to Southern Trees" by Harrar and Harrar. The North Carolina Department of Conservation and Development sells a little pocket manual for twenty-five cents entitled "Common Forest Trees of North Carolina." It is a good manual with which to begin your study. Not to be overlooked by those interested in Western North Carolina is "Trees, Shrubs, and Woody Vines of Great Smoky Mountains National Park" by Arthur Stupka, that dean of North Carolina nature trail builders who was naturalist and biologist in the Great Smoky Mountains National Park for nearly thirty years. The University of Tennessee Press published a very good little photo book called "Great Smoky Mountain Wildflowers."

The best all-around field guide on the subject is "Wild Flowers of North Carolina" by William S. Justice and C. Richie Bell, published in 1968 by the University of North Carolina Press. Few other states have such a complete and well-prepared book on their flora, and it perhaps is the best book of its kind in the United States. The color photographs by Dr. Justice and others are superb, and the text by Dr. Bell is easy for the non-botanist to understand, but still scholarly and authoritative. Dr. Bell is one of the authors of the masterful "Manual of Vascular Flora of the Carolinas." Dr. Justice is a practicing physician in Asheville.

There are numerous other plant identification books to be found in libraries, but the ones described here qualify as the best known and most useful in North Carolina. ⬍⬍

Bee-ware!

by Frank Mooney
Rougmount

BRET, my eight year old son, once had an insatiable urge to capture bees, wasps or just about any flying insect in a glass jar with holes punched in the top. He would let them fly away after holding them captive for a while. I had talked with him about the importance of bees and pollination of flowers and also how dangerous they are to some people. Much of the talk was to no avail; he finally got his comeuppance. The day the bee stung him through the petal of an azalea, the bee collecting stopped cold. I had told him that one day a bee would sock it to him, but he thought a slip up would not occur.

In our backyard, the white clover is hard to control even if mowed frequently. At this time honeybees gather to sip the nectar. In warm weather the kids, as most children do, like to play barefooted and each received a bee sting before they began to watch out for the bees. One day I laughed at Bret for getting stung on the foot, then sometime later I got my "reward." One afternoon after work I was in the backyard playing with the kids. The yard was mowed clean and it looked so inviting that I removed my shoes. There was a piece of clover buried under the freshly cut grass, and a small honeybee did his thing when I made the wrong step.

The bee clung to my foot a few seconds before I could knock it off, steadily pumping the poison in my system. After removing the sting, I continued to play with the kids, but not for long. From my waist up I broke out in a rash that itched something awful. The spots looked like someone had hit me with a bullwhip. It lasted several hours. Until that time I had never had any lasting effects from a beesting.

Surprisingly, in most years bees—perhaps mostly bumblebees—cause more deaths in the United States than scorpions, spiders, and reptiles combined. Many people will stop and say "you're putting me on," but during the years of 1950 through 1954 in the United States alone, 71 people were killed by hymenopterous (bees, wasps, etc.) insects. Reports from the American Medical Association claim that bees and wasps claim a minimum of 17 lives a year in the United States alone. Some researchers believe that many deaths from poisonous stings are erroneously attributed to heart attacks, heat stroke and other causes.

Insects cause many people to wreck their autos each year, running into bridges, into rivers or another car. Some people go into shock when stung. Upon being stung, some people have to be admitted to the hospital for treatment, or a serious illness may occur. The giant red bee found over much of South America is reported to kill even the mighty jaguar.

One day I was fishing in my boat and looking for a spot to anchor. Two partly submerged logs, one with a small green bush growing on it, looked like a good place to tie up. Just before tossing my anchor rope around the bush I noticed a large wasp nest almost covered with wasps already cocked for action. Talk about vacating a spot, I did!

During my childhood days, I remember a friend of mine going squirrel hunting. The weather was unseasonably warm, and the insects were active. This hunter shot a squirrel, but only a crippling shot and the critter crawled into a hole. The hornets stung the squirrel so much it had to crawl out. The hunter not wanting to be outdone tried to get the squirrel. The hornets being all worked up and fighting mad made a beeline for the hunter. The hunter in his fast exodus, lost squirrel, gun and hat. Later he said losing his hat wasn't so bad, since his head swelled so much that the hat wouldn't stay on anyway!

Children should be made aware of bees, and how dangerous these insects can be if not handled with caution. Especially on outings such as camping, fishing and picnics, there is a good chance of making contact with the insect world. Each year young tots get into bee or wasp nests, causing some painful and poisonous injuries.

There are over 10,000 species of bees living in every part of the world except the North and South Poles. Many of our plants most important to man are dependent on bees for pollination. Without pollination many fruits and vegetables could not exist. Parasitic wasps are one of the best natural controls of many plant-eating pests. The mud wasp fascinates most children with its organ-pipe shaped nest. Under bridges, and various other structures, I have watched a mud wasp quickly build a nest where mud and water were plentiful. The nest is filled with caterpillars, spiders, beetles, flies, ants, and other insects, then the wasp deposits an egg on one of its prey then seals the nest off. When the offspring arrives, the food is already present. Young wasps like their prey alive.

The adult wasp stings and paralyzes its prey, but leaves it alive for storing in the nest. Once I found a leaf cutter bee nest where pieces were cut and packd into a small tunnel in the ground. This was interesting to find pieces of leaves cut and packed so neatly with a bee egg inside the ball.

I never fail to be fascinated by nature's strange and efficient ways. Human life on this planet would be unthinkable without this little invertebrate, the bee . . . ⬍⬎

Kingdom Beneath Our Feet

by Allein Stanley
Statesville

THE Old Man of the Woods stands as a silent sentinel, guarding the gateway into his lands. He is hidden behind a fallen log and his blackish, fuzzy coat completes his camouflage. If we see him at all we more than likely "see" a pine cone and pass by.

The Old Man is a member of that strange and wonderful society of fungi with which we share our planet. From the viewpoint of the fungi, we merely borrow space on earth for they are both older and more numerous than man. Of all our cohabitors and in spite of their abundance, they have kept their secrets most successfully.

If we select for study only the narrow spectrum of those large specimens which fall within the category of mushrooms, toadstools and relatives, we soon discover that our understanding is quite limited. After centuries of observation few bear

Mushroom identification, particularly for eating purposes, is a tricky proposition and usually should be left to an expert. Shown here are 1. Morel 2. Inky Cap 3. Shaggy Mane 4. Meadow Mushroom 5. The POISONOUS Death Angel 6. Vermilion Cantharelle 7. Oyster Mushroom 8. Giant Puffball.

common names and many of these reflect vague overtones of the super-natural: fairy rings, trumpet of death, jack-o-lantern, earth stars and, of course, the destroying angel. Such names whisper of suspicion anl ignorance.

Man *has* learned that mushrooms are seasonal, often highly selective of habitat and that some form rather specific relationships with other plants and trees. Some are good to eat. Some cause hallucinations. Some cause poisoning or death. Mycologists are still busy classifying species and investigating their functions.

As mushrooms do not manufacture food and must feed off other organic material, they are regarded as our scavenger plants—returning dust to dust. Fallen leaves, animal droppings and forest trees are reduced to soil through their work. Thus they assume the burden of the cycle of life, fulfilling the rhythm of birth to death, death to rebirth. It is this function, coupled with their toxic qualities, which tends to shut them away from our appreciation.

An opposite service is found in that peculiar relationship with other plant life called mycorrhiza. We believe that the microscopic underground spawn, which is the true plant of the fungi, assist rootlets of trees and herbs in breaking down the food supply within the soil. The fact that particular mushrooms are often found only under certain trees or only in connection with specific plants indicates a mutual dependency.

Man is not so dependent upon mushrooms for food but holds them in high regard as gourmet fare. Each edible variety has its distinctive and usually delicate flavor. It may be nutlike or meaty and at least one has a smoky taste. Unfortunately, and further reflecting our failure to turn the key into their world, we have learned to control the fruiting of only one species although there are others which hold more tempting commercial possibllities. Therefore, the dedicated mushroom-lover must add to the taste delight that of the adventurous search in the wilds.

So rich and varied are the mushroom populations in our state that we can find them almost any time and in any place. Spring and fall are the peak seasons but, if there are ample rains, summer offers a steady progression and even midwinter may provide a few tucked away in stumps or nestled deep amid pine needles. Woods, pastures, roadsides, school yards and lawns are hunting grounds. City dwellers may find them pushing up between curbstones or in flower beds. For the hobbyist, only curiosity and sharp eyes are required for the reward of discovery and loveliness.

Although only a few varieties are considered gastronomically choice, many of these are locally common and often abundant.

The most exciting of the "edibles" and most easily identified is the morel, a mushroom relative, made distinctive by the little depressions which cover its surface. Its colors range from off-white to chestnut brown to black. If it appears at all in a given year, it only fruits while the dogwood blooms. The morel is so beautifully camouflaged by the duff of the woods floor that discovery invariably brings a thrill of pleasure.

The inky caps and shaggy manes soon follow. These delicate little fellows have the peculiar habit of melting into a black juice as they disperse their spores. They must be gathered as they push up through the soil and eaten within a few hours for their life span is very short.

The meadow mushroom, commonly called the "pink bottom" sprouts in spring and fall and is a close cousin to the commercial variety. Its flavor is both an improvement and an intensification of those purchased at the store. Along with many other species, it often forms fairy rings in pasture or lawn.

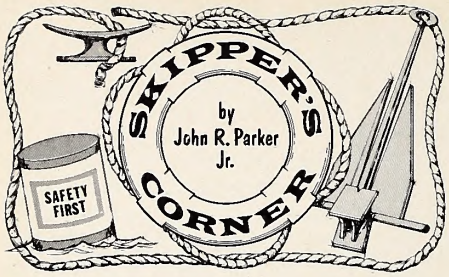
Another mushroom relative, the fluted cantharelle, marches through the summer months, flowering the woods in beautiful shades of pumpkin and vermilion. With obtuse ridges trickling down the stalk it, too, is distinctive for the collector. Eggs scrambled with this jewel make a breafast royale.

August and September entice the puffball up from barren road cuts and poor soil. It frequently reaches a generous softball size. Its flavor is quite bland and demands culinary know-how.

Other table desirables which may be found here include some of the milk mushrooms, so called because they bleed a juice when cut, some of the boletes which bear pores rather than gills and some of the hedgehog families. Decaying stumps may yield a mess of the oyster or a cluster of the honey mushroom. Certainly, the possibilities exceed time for hunting.

The majority of such fungi found on any gathering trip will be those either inedible because of an unattractive taste or inedible because of poisons. We must be content with beauty when coming upon the scarlet russula, the slimy, golden hygrophorus, the tissue paper little wheels or any of the warty and colorful amanitas. The good and bad are intermingled as in many other aspects of our existence. Sadly, there are no safe rules-of-thumb for separating these. Characteristics so span the families that only a thorough acquaintance with each species can protect one from discomfort or a worse fate. Animals and insects may feed where we may not. The gorgeous, pure white death angel can cause a prolonged and agonizing demise. With stakes so high, utmost caution and detailed knowledge are mandatory.

In spite of such frightening capabilities, our mushrooms can be a source of pleasure and satisfaction. These fungi dwell in beauty, offering their delights in riotous abandon or solitary dignity. One is impressed by their indifference to our passage. We may enter their fascinating community by a pathway. We may enter and walk, discover and enjoy. But they will retain their mysteries. It is good for the spirit to be so humbled. ⬍⬍



ALTHOUGH recreational boating is governed by a minimum of written rules and regulations, every boatman should be thoroughly familiar with the unwritten or common sense rules of the sport. Here are a few which are especially important.

Never overload a boat. Especially in smaller craft, the seating space provided is not necessarily an indication of the number of passengers the boat will safely carry.

Be sure your boat is equipped with legally required items as well as others that may prove helpful in an emergency. Life preservers, of course, are a "must." But don't forget things like extra line, anchor, paddle or oars, basic spare parts, and tools and a first aid kit.

Take it easy when boating on unfamiliar waterways. Watch for shoals, submerged obstructions and signs. Try to get information in advance from someone who is familiar with the area.

Distribute the load evenly. Passengers should be seated so that the boat rides level. Proper placement of equipment will also help.

When boarding a small boat, step toward the center and not on the gunwale.

Outboard Know-How Prevents Lost Weekend

In this day of advanced technology and the sophisticated modern outboard motor, many boatmen are unfamiliar with the mechanics of their engine. A little outboard know-how, however, can go a long way in preventing the frustration of a lost boating weekend.

For example, what do you do if your engine won't start. First check the fuel system. Make sure the tank isn't empty, and the fuel lines aren't kinked. Also check to see that the line is connected at both ends and that it is not being pinched under a tank or at some other spot. The condition of the engine's filter can also be a factor.

If a warm engine won't start, chances are it's flooded. To remedy this, disconnect the fuel line at the motor, advance the throttle and pull the starter rope several times. Then reconnect the line, squeeze the priming bulb and give it another try. This should do it.

Rough idling is another common but easily corrected problem. Turn the low speed carburetor setting knob slowly until the engine smooths out. Defective spark plugs and improper fuel mixtures can also cause rough idling.

If the motor is sluggish at full throttle, poor spark plugs are more likely the answer. If inspection shows them to be fouled or burned, they should be replaced.

Poor high speed performance can also be caused by other factors which can usually be quickly found by a qualified marine dealer.

Clean Hull

Boat owners who complain of mid-season sluggishness in their rig may find that marine growth and scum on their hull is the culprit. In this case, the boat should be pulled out of the water and cleaned immediately. If this marine life is allowed to dry and harden, the job is twice as hard.

Excessive vibration while the boat is underway is often due to a bent or broken propeller. If the prop is good, check to be sure weeds haven't caught on the lower unit. It's a good idea to have your prop checked periodically for proper pitch. At the same time, ask your dealer if the propeller you are using is right for the boat and load you are pulling.

These are basic answers to a few common problems. A little knowledge of outboards can mean the difference between fun afloat and frustration. Your owner's manual is also a handy guide to adjustments and it should be handy at all times aboard your

The seating arrangement in the upper photo is a bit cozier for the lucky skipper, but his boat will perform much better and with greater safety if it is properly trimmed (lower).

boat as part of a tool kit.

Outboard Powered Boats Retain Popularity

The outboard motor, old reliable, is still the most popular form of boat propulsion according to a survey conducted by the Let's Go Boating Committee, a group devoted to helping the new boatman get started in the sport.

Ever since the Russians introduced an electric-powered paddle-type contraption, and pushed a boat up a river near St. Petersburg, back around 1838, according to the Committee, people have been looking for new ways to get from here to there and back on the water without having to row or paddle. The modern outboard motor has come the closest, so far, to providing everyman's transportation.

Actually the first gasoline-powered, propeller-driven outboard was marketed commercially by a firm on Long Island Sound in 1896. This was the forerunner of today's outboard and incorporated many of the basic principles still to be found on virtually every outboard motor. From that day to this, the emphasis has been on refining and improving the product. Companies building outboards came and went, but outboards got bigger and better, more powerful and more economical, quieter and more trouble-free.

In the course of all this progress, a lot of people discovered the outboard motor and its potential for recreational activity. Today we have advanced from that first engine which developed a mighty 3/4 hp, to powerplants of from 1½ hp, to close to 150 hp.

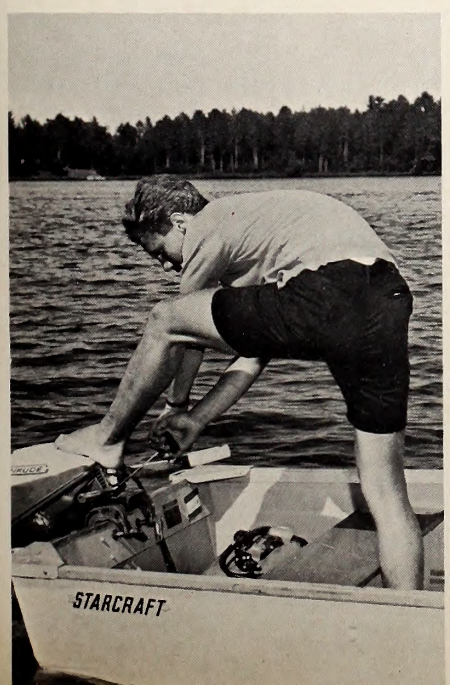
The newest motors show a host of changes, modifications, engineering refinements and improvements aimed at more power, safety and greater operator convenience. Space-age metals are used in engine parts, and sophisticated engineering techniques wring every bit of power out of the old reciprocating engine; but the outboard motor remains the easy to operate, economical jack of all trades it has always been.

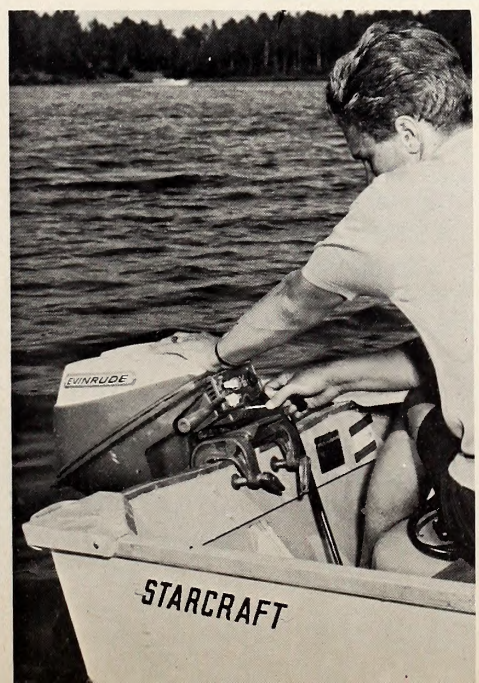
This is good news to both the beginning boatman and old salt. With all the improvements and refinements, the outboard retains every one of the virtues which made it so popular in the first place, and because of refinements and changes, has added quite a few new ones.

Gone are the days of the rope start, flywheel spinning and clouds of blue smoke. In its place we have electric starters, capacitor discharge electronic ignitions which start on even the coldest mornings. Smooth idling and greater fuel economy contribute greatly to ease of operation and peace of mind. Many of the larger engines keep batteries charged with the latest in alternators and generators, heavy duty ones that guarantee that the same motor that took you 20 miles into the wilderness in the morning will bring you back in the afternoon.

Serious and even fatal boating accidents have resulted from attempting to start outboard motors from a standing position. Even if the motor is inadvertently left in gear, a seated operator is less likely to be thrown out or caused to fall.

EVINRUOE MOTORS PHOTOS





Standards Book Available

The product of experts in the various areas of marine engineering, "Safety Standards for Small Craft" is a handy item for the fellow really interested in the fine points of boating. Four hundred and forty-six pages, 61 safety standards and reports covering hulls, machinery, electrical systems and other equipment for recreational boats is included.

Devoted to improving boating safety, ABYC consists of members from the broad spectrum of boating interests. The standards and reports are developed, reviewed and revised by representatives of industry, government and consumers.

Order at $5 per copy from American Boat and Yacht Council, Inc., 15 East 26th Street, Room 1603, New York, New York 10010.

Trailer Reprints

Reprints of several articles having appeared in this column on trailers, trailering and trailer laws are available at no charge. Simply write to *Wildlife in North Carolina,* Box 2919, Raleigh, N. C. 27602 and ask for boat trailer reprints.

Outboard Motors in Use

The Outboard Boating Club estimates that there were 7,215,000 outboard motors in use in 1970 in the good old USA. Retail expenditure last year, $3,440,000,000 spent on boats and boating. And some 44,070,000 persons participated aboard some 8,814,000 boats. Here in North Carolina boat registration, involving boats of over 10 horsepower, climbed to 76,239.

America's Wild Flowers Continue to Flourish

by Louise Lamica
Wilmington

THE small clump of flowers fairly sparkled by the roadside—their tiny faces upturned to the wind and a crisp summer sun.

Near them others bloomed. One a dark yellow, the Coreopsis, obviously kin to the daisy family, similar yet lacking some features of the more domesticated Black-Eyed Susan, or cone flower.

Others grew in clumps along the roadside. Wild asters, their deep pink contrasting brightly against the wild Gaillardia, this flower of the daisy family containing the colors of a russet sunset.

Only a few feet away, traffic whizzed by, almost jarring the earth in which the flowers grew.

Gasoline fumes, too, filled the air, and the smell of diesel oil reeked in the warmth of the day.

And yet the wild flowers grew—abundantly and profusely, against many odds, their petaled faces upturned to every breeze.

Growing within inches, almost, of America's heavily traveled highways are her wild flowers, almost unnoticed by wayfarers. Those who do stop to admire them often dig up a clump to take to their own yards—only to find they wilt and soon die away from their natural habitat.

Variety Flower Land

North Carolina alone has thousands of species of wild flowers. Some are showy and fragrant, like several species of morning glory, whose blooms last only a few hours, found on open, sandy and dry roadsides, in old fields and along fences and in waste places. And yellow jessamine, common in thickets, open woodlands and along roadsides in North Carolina's coastal plain.

Some are poisonous, like larkspur and sumac. Some may be pesky, like cockleburs and wood ticks. But in the main, most are harmless and afford a wild beauty to our roadways and woodlands.

Why does nature choose to nurture gorgeous blooms and such heady fragance in woodlands and wilderness where some will never be appreciated by the human eye?

Why are there wild flowers? What are their functions other than a part of natural beauty? Why their beauty, and to whom and what are they "putting on" these beautiful colors?

It seems that nature has not put them in her wilds for either man, insects or birds. There is much scientific data disclosing the elaborate pains wild flowers have gone to to keep certain birds and insects from robbing them of their precious nectar.

Once, millions of years ago, there were no wild flowers, the only seed bearing plants gymnosperms, ancestors of our present day conifers.

The more highly evolved plants—known botanically as the angiosperms, or seed in a vessel,—became the specialized, complex and often beautiful structures we call flowers.

Flowers on any plant are produced that they be more attractive, but we are not the ones they are trying to attract. Only a few select insects, an occasional bird or bat, and other creeping, crawling and flying things are lured by flowers—to carry pollen from flower to flower to propagate its species.

Wild flowers exist because it is nature's law that each of her creations seek to further its species. and the flowers that often go unnoticed are the results of millions of years efforts of seed bearing plants to propagate.

Adapting to Environment

To do this, wild flowers have evolved from gymnosperms by tediously adapting themselves to their environment under constantly changing conditions, and by developing such phenomenal parts as the pollen tube, one of the most amazing growth phenomena in nature.

The pollen tube is part of the complex structure

of a typical flower, which is made up of four sets of parts. Each part is specialized for a particular function.

The outermost series of parts is the calyx, made up of sepals, which protects the flower in bud. It is usually green.

The second series of parts is the corolla, or petals, their color, shape and scent serving to attract the insects or birds often necessary for pollination, which is the transfer of pollen from the anthers to the stigma.

The third series of parts is composed of the stamens, each of which bears a pollen sac, or anther, at the end of a slender filament. The pollen produces the cells that function as the male gametes.

At the center of a typical flower is the pistil, or female reproductive portion, made up of three parts: the pollen receptive area, the stigma; a region of connective tissue, the style; and the ovule producing portion, the ovary or ovulary. The ovules, after fertilization, will develop into seeds and the ovulary will become the fruit.

Flowers must depend on certain insects to carry this pollen. Not all flowers, however, have all these parts. Some have no petals, their flowers small, insignificant and not very pretty. They do not attract insects, and their pollen is carried by the wind.

But the flowers we see are nature's billboards, advertising free nectar, a lure for agents that carry pollen. And these insects recognize their shape, color and what particular brand of free nectar each flower has to offer.

As soon as a grain of pollen makes contact with the right flower, the plant begins producing its pollen tube—a very thin tube extending the style of the flower into the ovary, where pollen contacts an ovule and fertilizes it.

This distance may be several inches in some plants and as much as 18 inches in others. This growth from the grain of pollen to protect its precious ingredients—which may be less than one-thousandth of an inch in diameter—is made within a few hours.

If the pollen tube was an inch in diameter and grew a proportionate tube, it would reach about four miles.

This is but an outline of the complex work of wild flower propagation going on right under our feet at times—and the story behind these beautiful blooms along our roadsides.

Each little flower has its own characteristics—which makes it as individual as our own fingerprints. They are constantly adapting to change in soil, wind, rains, floods, and any other part of wild life to which they are so vulnerable.

Their seeds may be swept by these elements into areas where they have never before been seen. Many perish, but some don't, and hang on to develop under new soil conditions, adapting themselves eventually to their new environment.

Flower Facts

Following are some of these individual characteristics peculiar to wild flowers:

The Pinkshell Azalea (rhododendron) is native only to North Carolina. It must be cultivated elsewhere.

There are only two species of trailing arbutus, one in the southeastern United States, the other in Japan.

The Rare Fringed Gentian of this state grows only in two of our mountain counties.

Many varieties of wild Morning Glory were introduced into the United States as garden plants, escaping to become thoroughly naturalized in fields and woods.

The species of Morning Glory listed botanically as *Ipomoea machrorhiza* Michaux, is rare in North Carolina, known only from sandy clearings and beaches around Southport. Its flowers are crinkled, usually white with purplish center, and its leaves are rough and crinkled.

One of North Carolina's wild flowers, the Apple of Peru, was introduced from South America as a house and garden plant. Its seeds escaped and became naturalized.

The wood vine Trumpet Creeper, or cow itch vine, has only two species. The one native to North Carolina is the only species in America; the second is in Asia.

Honeysuckle was introduced long ago from Japan as an ornamental.

One of this state's wild flowers is named Flower-of-an-Hour. As its name implies, its creamy blooms last but a short time. It is related to the Hibiscus.

Yellow Fumewort, native to the central United States and a few mountain areas, appears to have been introduced in the Wilmington area where it is naturalized.

Poppies, whose showy petals last hardly a day, appear to be thoroughly naturalized only in the vicinity of Wilmington.

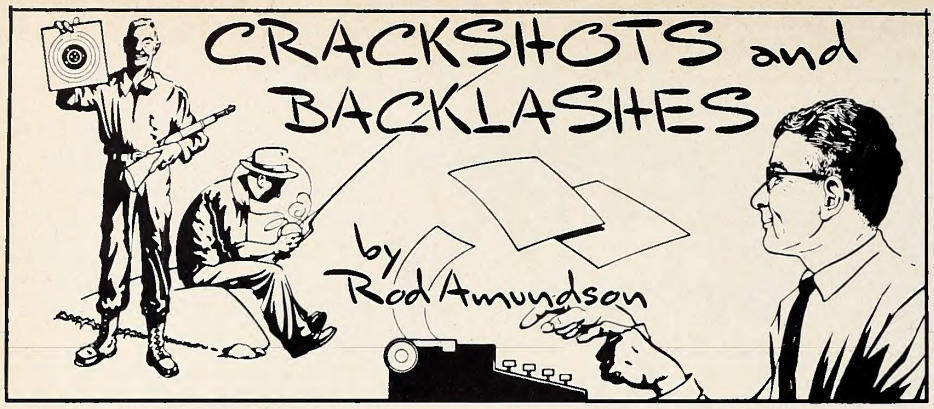
The famous Venus's FlyTrap, which grows in the United States only in a 60-mile radius of Wilmington, is among the 150 species of wild flowers in North Carolina threatened with extinction.

It is one of the world's most unique plants.

Others placed on the state's conservation list, which means the plant is threatened with extinction unless care is taken to maintain it in its natural habitat, are the entire Pitcher Plant family, native to North Carolina.

Its varieties are the Trumpet, which has bright yellow flowers; Sweet Pitcher Plant, its blooms a deep purple; the Hooded Pitcher Plant, which has spotted flowers, and the Pitcher Plant Flytrap, also with purple blooms.

The Redbud, or Judas Tree, also has been placed on this list, along with Flowering Dogwood, Sea Oats, Orange Bell Lily, the Meadow and Carolina Lily, nearly every member of the Orchid family, the Birdfoot Violet, Great Laurel and four species of wild Azaleas. ◆



"Bear in mind the relationship of each animal or plant to its particular environment, and remember that all of them—no matter what our personal feelings towards some may be—are, in the words of the late Henry Morton Wheeler, our only companions in an infinite and unsympathetic waste of electrons, planets, nebulae and stars." Sonora Desert Museum, Tucson, Ariz.

Each time WILDLIFE IN NORTH CAROLINA has mentioned or depicted the American panther (*Felis couguar*) there has been a flood of letters from people who claim to have observed these largest of North American wild cats. These letters come from people whose credibility cannot be denied.

Reports of cougar sightings come from both the mountain section of the state and from the swampy regions of the coastal plains. Wildlife protectors who work in the Green Swamp area have seen these tawny animals on a number of occasions. One had a report from a hunter that he had seen a cat much larger than any domestic variety, but smaller than a bobcat. The hunter said the cat was brownish with dark spots, and had a long tail. This describes the young of the cougar.

Most reports say the cougars observed were tawny or yellowish brown, while others described the big cats as being black. This latter can be explained by the occurrence of melanism in the species.

In his "Field Book of North American Mammals," Anthony states that many people spend their lives in cougar country without ever seeing one. The animals are usually nocturnal in habit, and extremely shy and elusive. There seems to be little doubt that cougars, panthers, pumas, or painters—whatever they may be called, do exist in North Carolina, and there can be no question about their scarcity. Wake County Senator Ruffin Bailey, who reports having seen a cougar in Hyde County, has agreed to introduce legislation in the 1971 General Assembly that would place these magnificent animals under complete legal protection.

Another native wild cat, commonly called "bobcat" or "wildcat" is likely to be given serious consideration by the Legislature. These animals are known to be scarce, and although predatory like the cougar, they play an important part in the balance of nature by taking the weak, maimed, or diseased forms of wildlife.

Legislation to place bobcats under legal protection is amazingly simple. All that is needed is to amend Section 113-102 (c) by deleting the word "Wildcats" from the list of unprotected animals. This would give the Wildlife Resources Commission authority to establish open and closed seasons. This would relieve a lot of out-of-season big game hunters from the standard alibi "I was hunting wildcats".

Following are letters from the Commission's files on cougars:

Dear Sir:

Looking at the December issue of *Wildlife in N. C.*, I noticed the Carolina Cougar was selected as the cover picture. As I turned to

Cougar

Bobcat

the second page and read about the cover photo, I noticed you asked the question as to whether they are still roaming the deep recesses of the Tarheel landscape.

It is to my present knowledge that the Carolina Cougar still exists. In the month of August of 1969 I made my first official sighting of the Carolina Cougar, which has been known to roam this area of the Piedmont for quite a few years. Before this I had sighted the Cougar in a field below my house, but was uncertain of what I had seen, until my sighting it in August. I was about 35 to 40 feet away from the cougar when I saw it in August of '69. I was camping in the laurel thickets below my house. I woke up at 7 o'clock in the morning and saw the cougar coming down the hill in front of our tent. I woke my buddy, and told him that a panther was outside. He did not believe me at first, but when he saw it he was convinced. I studied it closely from within the tent as it drank from the stream below us. There is no mistake about it, it was a Carolina Cougar.

Since then, and as recently as October 1970, I, as well as others, have heard the horrible screams

from the cougar. Other people in the area have claimed to have sighted the cougar. One man claims that he knew some kind of large animal roamed these woods since 1939, when he first heard the cougar. From what he says, he pastured some of his cows on his land a few years ago, and had to remove them within a week. One cow had its hind quarters mangled and another cow's neck had been ripped.

From all the information, I decided to write you in concern of the possibility of the extinction of the Carolina Cougar. I believe that there are at least three cougars roaming the area of Caldwell County and Burke County. I will assist in any way possible in gaining further information on the Carolina Cougar and guiding any professionals you wish to send to the areas of my sightings.

Unless the appropriate action is taken, the Carolina Cougar may cease to exist or roam this section of North Carolina.

I am seventeen years old and have been interested in wildlife all my life. I have known that the cougar existed in this area for three years, but did not know it was so near to extinction. I believe I can obtain places to establish feeding stations that will attract game for the predator or any other ways of prolonging and hopefully, completely saving the Carolina Cougar from extinction.

Please contact me on your decision.

Roger McCall
Morganton

Dear Sir:

Your always interesting *North Carolina Wildlife* has a special personal angle for December. Its cover shows a large cat on a scene almost exactly like one where I saw such an animal cross the Blue Ridge Parkway near Graggy Flats. Five other people witnessed it with me in the late 1940's. When I remarked on this to two friends, Mr. Gordon Ramsay of the Buncombe Sheriff's Department and Mr. Bob Terrell, feature writer for the *Asheville Citizen,* each said he had a good clear view of a large cat such as we call panther. The Ramsay view was on the crest of the western Smokies Range. Terrell's was in Jackson County, so he said.

George Stephens
Asheville

KNOW YOUR PROTECTOR

Charles Stephen Piercy

Wildlife Protector Charles Stephen (Steve) Piercy, was born October 12, 1942, in Maiden, N. C. Protector Piercy is the son of Mr. and Mrs. Charles Setzer Piercy of Maiden.

Steve graduated from Maiden High School in 1961. Prior to employment with the Commission, he served two years with the U. S. Army in Viet Nam and the United States. He was employed as a Wildlife Protector Trainee for Henderson County on February 16, 1970, after completing a three-week Basic Recruit School on February 14, 1970. Steve was transferred to Haywood County on July 1, 1970. Since then he has completed one-week Defensive Tactics and one-week Pursuit Driving Schools.

Steve is presently living in the Bethel Community with his wife, the former Brenda Setzer of Newton, N. C. and their 17-month old daughter, Angela Lynn

Beaver Plea

Dear Sir:

Since having read the splendid article written by Miss or Mrs. Nell Lewis regarding the needed protection of our beavers, I thought that I too would add my plea in the interest of both mankind and these fine animals. As it has been proven beyond a doubt that the beavers have been repeatedly proven that they are great benefactors . . . to mankind as dam builders, why is it that the broad-minded man cannot understand and be more desirous to cooperate with the state's conservationists? Befriend and defend these animals and be more helpful to mankind as well. Surely, I too think that everybody should join in talking the idea up!

It would undoubtedly be a perfect shame for some trappers to kill the beavers off, since it has been so well proven that they are very beneficial to man as dam builders and conservationists, as a result of their natural abilities. It just stands to reason from anybody's point of view, I think! More benefit could be realized by far, from protection of the animals, and let them carryon in their natural way and thereby help more of constructive mankind. It's far more admirable to be constructive and conservative, than to be wasteful.

Romey Earl Butler
St. Louis, Mo.

Awright, Youse Guys

It may not take its place in history beside the "Great Train Robbery," but the "narcotics raid" at Tarrytown Mall Thursday was something to behold . . . except it was never beheld!

It began with a call to the newsroom from a newspaper employee that uniformed state agents had surrounded a green stationwagon on the Mall parking lot. The station wagon was loaded with little bags of what were believed to contain narcotics, the caller said.

Almost simultaneously, a call went to the local police department that narcotics were being passed at the Mall. Two detectives were dispatched immediately to the scene, closely followed by two reporters and Telegram Photographer Charlie Killebrew.

Arriving on the parking lot, reporters saw an olive-colored stationwagon bearing a state license being attended by two uni-

formed agents. The photographer was already leaving the scene.

Close inspection of the agents at the stationwagon revealed that they were wearing the uniforms of the Wildlife Commission.

Inside the Mall, the two detectives were approached and asked about the incident, and replied that they had not seen anyone passing narcotics.

A call from the newspaper was made to the Wildlife Commission here and the mystery was cleared.

It seems that a district meeting of Wildlife Protectors was underway at the K & W Cafeteria on the Mall, and attending were 17 uniformed protectors and a commission employee in regular clothing.

That cleared up the mystery about the numerous uniformed agents surrounding the stationwagon. But what about the little bags that looked as if they contained narcotics?

"Well," explained a spokesman for the Wildlife Commission, "we had 600 bags of plantings at the meeting that were given to the protectors to give to the farmers; something we do every year."

Confronted with the results of the efforts to find out what was going on, the Telegram employee just shrugged his shoulders and said, "Leave it to Rocky Mount. In any other city it would have been done. Here, it's plantings for the farmers. No wonder agriculture is king in this area."

Bill Stancil
Rocky Mount Telegram

Attack On Wildlife

The all-out assault on wildlife is illustrated with a fascinating and horrible force in some of the men's specialty catalogs.

For a price—usually high—the discriminating male is offered all sorts of items for his personal use. In each instance the material originated with a wild animal.

He is offered billfolds made of seal or an elephant's ear. A belt of water buffalo is billed as something to be treasured. Some skins are used for exotic neck wear.

Just the item for a bachelor's pad is a genuine zebra skin, which has been carefully cut from the deceased animal and treated. The buyer is more or less assured of considerable success in the female conquest field as the result of such an acquisition.

Considerable concern has been expressed for the number of valuable animals being destroyed for fur coats for milady. Little has been said about the many specialty items for the male.

Ashtrays made of an elephant's foot and many other bizarre offerings are made under the guise of being prestige possessions.

Little thought is made to the proposition that presumably an elephant's ear is taken from a dead elephant.

Far more reasonable and not as destructive is another exotic item for the male — cufflinks made of genuine dinosaur dung. — **Newton Observer & News-Enterprise.**

BOOK REVIEW

A Modern Dry Fly Code

In the long, rich history of fly fishing for trout, there have been many books, most of them seriously flawed. Either the angler wasn't a writer, or the writer wasn't an angler. In some cases, the author's observations have been trite and obvious, or bound by romantic traditions which the author could not violate—even in the face of overwhelming evidence.

Vincent Marinaro has committed none of these errors. His book, *A Modern Dry Fly Code,* is one of a handful of truly great books on the subject of fly fishing for trout.

I first read Marinaro's book in the early 60's. A friend of mine had a copy which I borrowed. I was impressed. I was even more impressed when I tried to buy a copy of the book. First printed in a limited edition in 1950, copies were selling for more than $140.00. Those first editions are even more valuable now.

The anglers of this decade are indeed fortunate that Crown Publishers has reprinted this classic. The newest edition is a handsome volume. A foreword, written by the author, reviews the 20 years that have elapsed since its first publication, and updates a few observations in the original text which time and advancing civilization have altered. The new edition also contains three pages of color plates showing the unique flies which Marinaro uses. These plates were not part of the first edition.

Although originally published 20 years ago, the book is still far ahead of its time. Marinaro's pragmatic observations on trout habits, angling techniques and dry fly dressing are as useful now as ever. It was Marinaro and his angling companions who first introduced anglers to the value of terrestrial (land-borne) insects in trout fishing. Marinaro was among the first to recognize the success that could be had fishing tiny flies (size 20 and smaller).

Fishing the famous limestone streams of central Pennsylvania, Marinaro experimented with flies and techniques that have influenced anglers throughout the world.

North Carolina anglers may find that some of Marinaro's observations do not apply in southern trout waters because of the lack of massive Mayfly hatches. North Carolina's streams have little in common with the limestone rivers like the Letort at Carlisle, Pennsylvania. Even so, the book provides valuable information for the trout angler whether he lives on the banks of the Letort or fishes the rocky chutes and small pools of streams in western North Carolina.

A Modern Dry Fly Code by Vincent C. Marinaro is available at $10.00 a copy from Crown Publishers, Inc., Mail Service Department, 50-10 34th Street, Long Island City, New York, 11101. You may also order a copy from the Orvis catalog. Write for a free catalog from The Orvis Company, Inc., Manchester, Vermont 05254. **by Jim Dean**

WHAT do you get when you cross a **Micropterus salmoides** with a **Lepomis macrochirus**? That may sound like a riddle in Pig Latin, but it's actually a serious scientific question that has probably intrigued quite a few fishermen, too.

A **Micropterus salmoides**, incidentally, is a largemouth bass, and a **Lepomis macrochirus** is a bluegill. The question then is what do you get when you cross a bass and a bream, and the answer is: a nameless hybrid that looks like a big-mouthed bream, but chases minnows like a bass.

You'll probably never catch one of these critters because they simply don't happen naturally, and it's even hard to make them happen unnaturally. Dr. F. Eugene Hester, a Professor of Zoology and leader of N. C. Cooperative Fisheries Unit at N. C. State University managed to produce a couple of these hybrids, but he had to strip the eggs from a female bluegill and place them in a watch glass where they were fertilized with bass milt.

Of course, the process was a little more complicated than that because bass and bream aren't naturally fertile at the same time. It's common knowledge that bass spawn much earlier in the year than bream do, so a graduate student, Jerry West, working with Dr. Hester, proceeded to trick the fish into thinking the calendar had gone haywire. By manipulating the artificial day length and the water temperature in separate tanks both species heard the mating call at the same time.

Even then, things didn't go smoothly. Out of thousands of eggs, only two little hybrids survived any length of time, and one of those was abnormal. He circled the pool much like a sick guppy, and seemed to have poor vision, too, because food had to be placed directly in front of him before he would eat.

The other one was a frisky little devil who chased minnows like a bass, but not quite as viciously. There was no time to find out whether he would have grown up to bust top water lures because he inadvertently committed hari kari when he was only seven inches long by leaping out of the pool one afternoon when it was unattended. ▲▼ **Donald M. Causey, Jr.**

• **continued from page 9**

ing so I switched to a light colored nymph and stretched it out towards the head of the pool. Wham! To this day I don't know if it was a trout or an alligator. The battle was short-lived and when I retrieved the line, a curl in my tippet told a sad tale of a poor knot that had slipped. I commented on it, wilting a patch of weeds near me, and returned to fishing. The pool was quiet for a while after the recent uproar. Then another rise nearby. This looked like a good fish taking a fly, so I switched to a Badger Bivisible. This brought up two trout, both of whom rejected it at the last minute. Was it too large or the wrong shade? Since it was a Number 16, I elected to change patterns again. This time it was a Hendrickson followed by a Fan Wing Coachman. I put both fish down.

Now it was growing darker. There was a splash at the head of the pool. I threw a March Brown at it and a good fish took hold. Less acrobatic than the first, he came in with somewhat less effort on my part. Nine plump inches of fat little rainbow. Smugness began to take hold. After a while it was back to nymphs. The leader suddenly shot ahead and a flick of the wrist got things going. With all the gracefulness of a ballet dancer, this chap really put on a show. It took several minutes to subdue his 12 inches, but finally he turned on his side and came along. I reached for him, out came the hook and there he went! Maybe there is something to be said for landing nets after all. Anyway, I continued with the nymphs, and still another lovely rainbow smashed it. This one was so dark his spots were almost lost in his coloring. And that was it. It was dark and time to go. Packing the fish in ice, my three lovely trouts and I headed home with one of the four of us quite satisfied. Some fisherman, me.

Then, second thoughts began to set in. In fact I had lost the two best fish I had hooked, one through a careless knot and another through carelessness in landing him. Furthermore, suppose instead of switching from the Bivisible to the Hendrickson of the same size, I had gone to a Number 20 Jassid or a Number 22 Black Ant ala the Marinaro-Fox theory? More trouts? Who knows? Maybe I wasn't so hot after all. Maybe I was darned lucky to have any fish. And then the real blow struck me! That can of beer was still in the creek way up the gorge. Zounds! But I reckon the creek ain't fished out, after all. ▲▼

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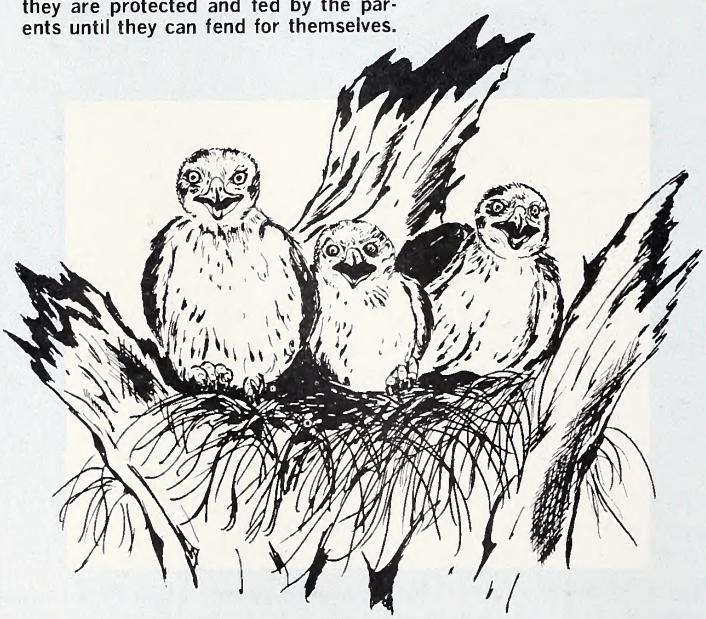
The Red-Shouldered Hawk

For the red-shouldered hawk courtship and mating occur in late March and by early April the nest is built and contains 3 or 4 eggs.

The incubation period is 28 days and the duties are shared by both parents. Young hatch downy and depend exclusively on their parents for food and protection.

Food consists chiefly of rodents, frogs, crayfish and snakes. At 5 or 6 weeks, young are nearly ready to leave the nest. They often flutter to the ground where they are protected and fed by the parents until they can fend for themselves.



The red-shouldered hawk is one of the most beautiful, beneficial, and least harmful of the hawks. Their protection and preservation is well justified.

A. Kocan '70

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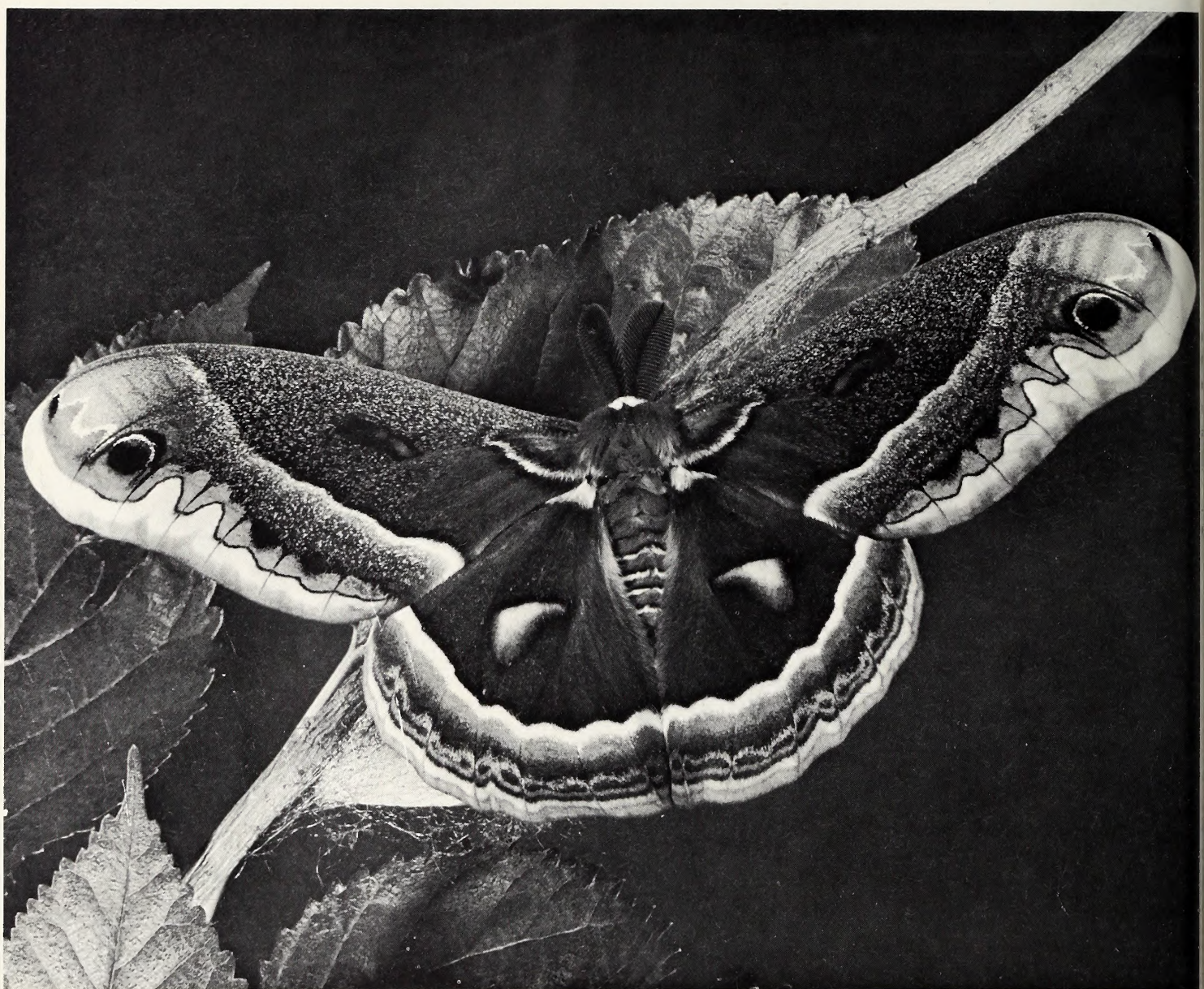

PHOTO BY KARL MASLOWSKI

Cecropia Moth

In Nature's vast scheme of things, there are creatures whose purpose may be obscure, but none-the-less necessary. The Cecropia Moth, with its magnificent 6½-inch wingspread, is such a creature . . . created simply to be.

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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The osprey, often called the fish hawk, once was quite abundant along our Tarheel waterways. Although there are still nesting populations of this great bird of prey, their numbers are steadily decreasing because of various environmental encroachments. They are protected by law from outright killing, but the more insidious forms of habitat destruction and food contamination continue. Painting by Ron Jenkins.

Fish Hawk

by

Mrs. M. Mason Daniels

Collington Island, N. C.

PHOTOS BY JACK DERMID

AT the top of a tall dead pine on Collington Island is a fish hawk's nest big enough to fill a road cart. Its occupants are intolerant of the encroachment of people and of neighboring crows that worry Mrs. Fish Hawk, threaten the eggs, and being smaller, out-fly and attack the larger birds. During this pursuit, the fish hawk, never attacking, only turns and dives to elude the crow. When not away from home working, the male fish hawk keeps vigil from the branch of a nearby cypress, apparently to spare wear and tear to the fragile weathered limbs of his own barkless pine. When we approach his tree, he takes off with an ear-splitting squawk that alerts his mate, and she leaves her nest simultaneously in a flurry of feathers and shrieks.

Both circle at a safe altitude, alternating in slow rhythm their glides and their wing-beats, threatening us furiously with their shrill, distressing noise.

North Carolina has many hawks but her fish hawk is becoming rare. Its fate is that of its cousin, the bald eagle, which is a victim of insecticide, habitat destruction and wanton killing. DDT has made inroads on our birds of prey by reducing their breeding potential. They eat the fish that ate the shrimp and minnows that fed on DDT-loaded marine vegetation. The insecticide prevents sufficient calcium in the egg shell necessary for a healthy, normal hatching.

We waited, apprehensive about this hatching, hoping that Albemarle Sound's vast stretch of water offered protection from pollution. The eggs, numbering two to four, laid in late March or early April, are attended constantly by the parent birds, and take about three weeks to hatch. Larger than chicken eggs, they are an off-white color, splotched in various shades of brown. The shell has a fishy-scented oiliness that can be detected even after 20 years in a museum case.

The fish hawk, (scientific name—*Pandion haliaetus carolinensis)* is an osprey (bird of prey). The Latin word for osprey means bone breaker. It has a short, strong, curved beak like that of the eagle. The bird is 22 inches long, and is dark

brown above, touched with black, gray and white. It is white underneath, sometimes marked across the breast with brown. To one looking straight up toward the mid-day sun for a view of the circling bird, the transparency of the 54-inch wingspread reveals geometric patterns of light and dark markings. For sheer beauty, the wings are comparable to that of a lady's delicate Japanese fan.

In April, the bank swallows (also called purple martins (*Riparia riparia*) arrived and set up housekeeping in the ample sides of the ancient nest, making it a vertitable motel. Soon they were darting in and out, twittering (not singing) and catching mosquitoes and sundry insects for their own hatching broods. At the end of April, when the parent fish hawks were away fishing, the heads of their three babies could be seen above these crowded apartments, as they craned their long necks and peeped out at the wide world. whose scenery includes the Wright brothers' monument.

This tall shaft of granite atop Kill Devil Hill, marks the site of man's first flight on December 17, 1903. Wilbur and Orville Wright, advised by the U. S. Weather Bureau that Kitty Hawk had steady winds of at least 18 miles per hour, and also being informed that the high sand dune would be an ideal runway for taking off, spent three years there working on their airplane. Meantime, as an aid to aviation, movement of local birds—such as our fish hawk—were studied for hours on end. This bird wings, floats and glides serenely for many miles in search of food.

Mr. Harry T. Davis, Director Emeritus of the North Carolina Museum of Natural History, grew up as a boy on Cape Hatteras. He recalls having often seen a fish hawk plunge 40 to 80 feet, and sink its strong talons into a fish that was so large it pulled the bird under water.

Usually, however, a smaller fish is captured by the bird, which upon emerging from the water, pauses to shake the spray from its plumage, turns the fish in its feet, so the head points forward, and starts for the nest. It is frequently pursued by the bald eagle which frightens it into dropping its catch and siezes the fish before it hits water. Thus the fish hawk feeds two families, and on occasion when carrying a too-large, too-lively fish, he feeds even more.

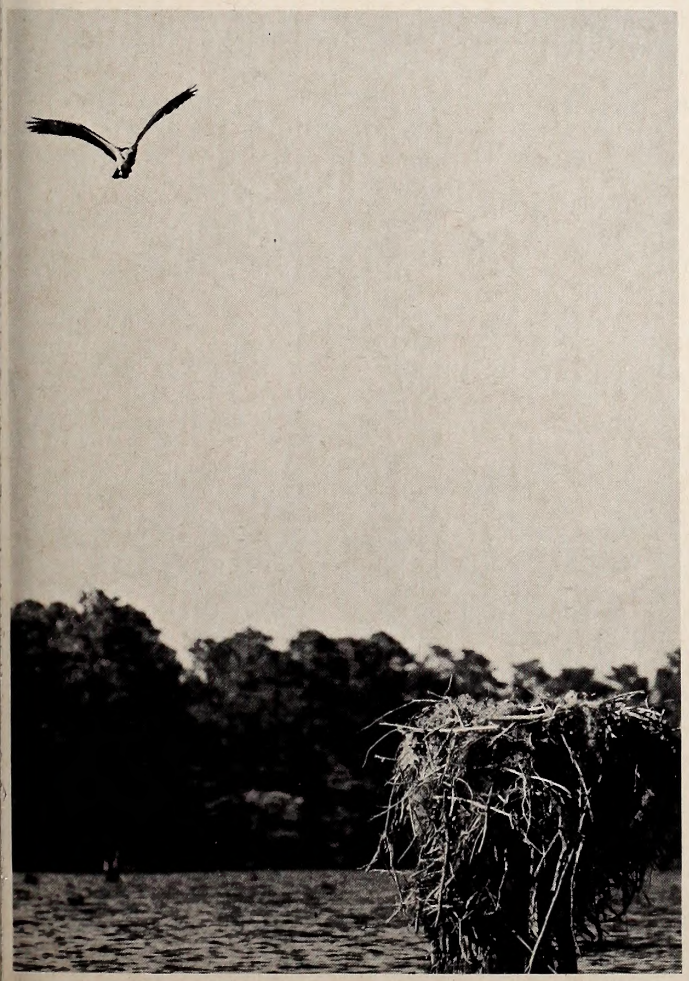
One fine day during retirement, Captain Edward S. Daniels, formerly keeper of Nag's Head and Oregon Inlet Coast Guard Stations, stood in his garden at Manteo. He wished he had a nice fish for dinner, and at that moment a large striped bass fell, still kicking, at his feet. Overhead, a forlorn fish hawk could be seen passing toward its nest in the nearby swamp. The fried fish made a nice meal, but the old Captain admitted that he was haunted by the lingering memory of that disappointed bird whose need was greater than his. The young ones remain helpless in the nest for months.

On a bright June morning, when the offspring finally took wing from the tall pine at Collington, they appeared to be as large as the parent birds. Both Mr. and Mrs. Fish Hawk, with one young bird, rode a blanket of air over the woods and out to the depths of Albemarle Sound for fishing. For quite some time, the two siblings waited, looking out over the nest, but they hid their heads in silence when we visited their tree. Later, when th three birds returned, the parents repeated the fishing trip for a second young one. Finally, the third one was taken along. On the second day of their free-flying experience, our visit to the tree was an unforgettable one.

Five full-grown fish hawks circled in deafening turmoil that soon persuaded us to leave their domain. But we were now reassured, knowing at last that the egg shells had not been too thin for hatching, and that these young birds had normal form and strength. These, however, were the only fish hawks that we saw all season. By autumn the big nest was completely abandoned.

In the coming springs, if the fragile dead branches have withstood the storms, and are still supporting the old nest, two fish hawks will again return to repair it with big sticks, sinuous vines and tough roots, repeating a lesson in parenthood, resourcefulness, industry, patience and sharing. ⬍⬍

The height of the osprey's nest varies from a few feet, in the case of this cypress stump, to 30 to 40 feet when old snags are available. The nests are almost always on the edge of open water of some sort.



Woodland Tragedy

by Grace S. Draper
Pleasant Garden

ALL day the plaintive notes of the little Eastern wood pewee echoed through the farmyard, *Pee-wee, Pee-e-wee*. For this was his hunting territory, and his nesting territory, too. He and his little matching gray mate had carefully built a story-book nest in the crotch of an outer limb of the old oak tree in the yard, using dried grasses and spider webs, and, to complete the job, picturesquely finished it off by covering the entire outside with faded green lichen, so that it actually looked like a big knot on the old lichen-encrusted limb. It was approximately 12 feet above the ground. Here his mate had laid three tiny eggs, which hatched into three downy gray babies that we could hear making muffled mouselike sounds in the nest above our heads, as they waited to be fed flying insects by busy parents.

At dawn that Thursday morning in August the sudden, violent thunderstorm awoke us all —and many birds may have by then left their nests to search for food for their young. It vented its fury in an hour and a half with wind, rain, hail, and much thunder and lightning, until suddenly it was over, and quiet again reigned supreme in the morning air. As we walked around, clearing broken debris from the yard, we found the pathetic body of the mother pewee beneath the old oak, beneath her nest! But we could see the father bird continuing to come to feed his young. Late that afternoon we could still hear them peeping, more or less contentedly, in the tree above—or so we thought.

But that night another rainy, windy storm again visited our area, and all night long it rained! We all thought about the little pewees the next morning, and fetched the long extension ladder from the barn in order to climb up to check on the babies. Not a sound could be heard from the little nest on the limb. And, as we had feared, a sad sight awaited up there: two tiny, lifeless forms, the third with only a spark of life left in its body, too weak to even breathe. We brought the little wet form into the house, wrapped it in flannel, and with a medicine dropper forced a warm milk and honey mixture into its tiny beak in an attempt to revive it. It shortly began gasping and breathing, and making feeble sounds, as it struggled between difficult life, and simpler death. Could we save the baby bird? Five hours later it had recovered to the point that it was dry, it could sit erect and hold its little head up, and make a measured series of its soft, mouselike squeaks, not hunger calls. It still seemed to swallow with difficulty, however. It would not beg, and it would not open its eyes. But it *was* alive.

That night when I went to bed at eleven o'clock, the baby was sitting in its makeshift nest making peeping noises, and no longer gasping for breath. We were most encouraged by the progress it had made.

But at early morning, when we went to check on the baby bird, we found it had gone to sleep sitting in the little makeshift nest, head up, and eyes still closed. Despite the valiant battle it had so strongly waged, that spark of life we had hoped to salvage had wafted away. It was a personal tragedy for us all —it had tried so hard when through no fault of its own it had been subjected to so many hardships! Exposure to the elements of cold, wind, and rain had overwhelmed the frail little body, exposure that even a stronger bird or animal could scarcely survive. It was a scant two-and a half-inches long, and already had the white distinguishing bars on its tiny wings, although only a few days old.

We could not contain the tears for our tiny bird, as we gently laid all three little forms to rest beneath the walnut tree in the yard, beneath a big rock marker.

We wondered: how many other baby birds in the woodlands must have suffered the same sad fate as our family of wood pewees? No one would ever know. Nature is a cruel teacher in many ways, and she had shown us, also a part of her plan, how we, too, could be as expendable.

Three days later we could still hear the father bird calling in vain *Pee-e-wee,* but there was no answer to his lonely cry.

The eggs and flightless young of most birds are vulnerable to many natural enemies and weather conditions. Whether this nest of mockingbird eggs will be successful depends on a series of good fortunes. Nature isn't always gentle.

Environmental Quality – What It Means To Me

by Michael L. Waters

This is the Second-place winner in the 1971 N. C. Wildlife Federation essay contest. Mr. Waters is a student at Pantego High School, Pantego, N. C.

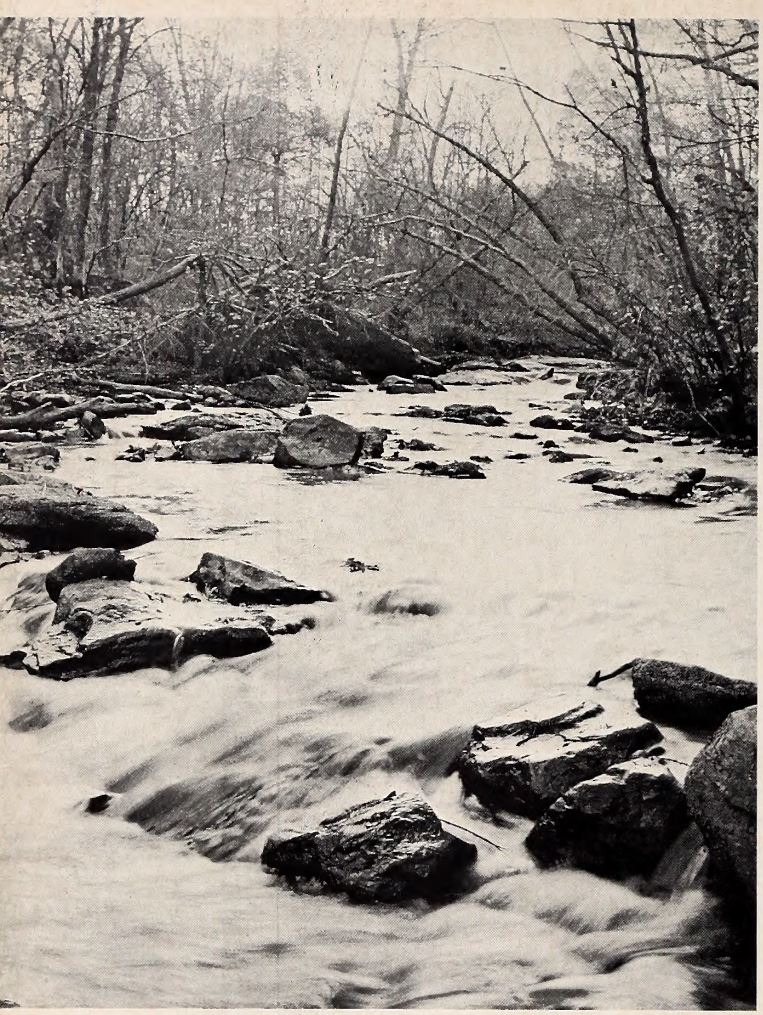
IN recent years, man has become more aware of the word *pollution*. He finds the word in his newspaper practically every morning and hears the word on the news report almost every evening. I often wonder if man is truly aware of the impact the word, and what it stands for, will have on his future. Will he take the task upon himself to make this an obsolete word rather than the grave reality that it is? Are the majority of Americans even aware that it is reality?

Those conditions and influences that affect me, known as environment, are seriously suffering from contamination by man and his greed for material wealth and luxury. Since my environmental quality affects me in such direct closeness, then as it suffers, so will I eventually suffer. We must realize that we make our environmental quality what it is in America. We have disregarded the delicate balance of nature too much and too often in previous years. We now face the consequences of this injustice to our surroundings.

Probably those pollution threats that we are more aware of than any are air and water pollution. They are rapidly becoming so contaminated that they are unfit for any useful purpose.

For our air pollution, we have the automobile as the chief villain. To help our prime polluter, there exist the industries whose smokestacks have been pouring deadly fumes into our atmosphere for years. Jet aircraft also have joined the list of smog producers as can be seen at the major airports in the nation. In fact in 1966, the technological achievements such as the auto, the airplane, the industries, and others poured approximately 188.8 million tons of pollutants into our atmosphere. According to the 1969 U. S. Senate

Although industry has often been singled out as a major contributor to the environmental mess our world is in, the problems frequently go deeper than that. All of us must assume the responsibility for conditions as they are, and we all must act to correct the situation as quickly as we can.



What's the price of clean waters? Actually the cost nationally is already staggering, and rising annually. Yet it is our very existence, not just fishing, or boating, or swimming, that we are talking about.

Commerce Committee report, automobiles have produced more than 60 percent of all air pollutants.

Assistance in controlling air pollution has begun to take shape with the help of Congress. The Clean Air Act is one such aid under which the National Air Pollution Control Administration has established emission control standards for vehicles. The colleges and universities are also contributing their share in the fight. In the early fall of 1970, these institutions entered into the Clean Air Car Race in which their vehicles traveled cross-country with the goal of producing the least amount of hydrocarbons and simultaneously trying to cross the distance in reasonable time. Out of 42 cars entered, only eight finished the race with emissions within the standards set for 1975. Yet, this is an outstanding achievement, for in reality these eight cars are five years ahead of their time in making cleaner air for us to breathe.

In 1970 the major petroleum industries have tried to help by producing low-lead and lead-free gasolines. This type fuel will be a necessity if we are to continue with the use of the internal combustion engine and, at the same time, meet the emission levels set for the next decade.

Sewage disposal, oil leakage, and uncontrolled pesticide spraying have led to the excessive impurity of our life-supporting waters. Man has dumped into our fresh water bodies the chemical refuse and organic refuse of industries, empty bottles and cans, and just plain junk until he has accelerated the eutrophication process to the point that, in 1968, 15.2 million fish were destroyed. The accumulation of minerals in this way causes the death of much aquatic life, leaves decay, and promotes the growth of algae which form scum on the top of what was once clear, beautiful water. The clear, pebble-lined bottom becomes blanketed with silt and muddy slime. In the end, the water and its life have turned to a malodorous, unsightly, dense growth of weeds and scum. It no longer contains any potential use.

Defiling of water resources has increased with the current oil slicks being produced by leaking oil wells located offshore in the Pacific Ocean, Atlantic Ocean, and Mexican Gulf. These oil slicks have adverse effects on ocean-going sea vessels; but, more tragically, these oil slicks cause the death of sea life. Waterfowl are often covered with the oil when they attempt to land in these areas. This oil coating makes it impossible for the birds to fly; if not rescued, they often die.

The Department of Interior has come to aid in cleaning up the water by enforcing clean water standards. Congressional legislation has ruled that firms will be held responsible for oil slicks they cause, and the same goes for oil tankers. The legislation further prohibits the dumping of sewage and curbs the amount of pesticides used near water.

Chemicals, which have often been praised as one of man's greater accomplishments, have started showing harmful effects on the balance of nature. DDT was originally intended to help in the extermination of pests. When the chemical came into contact with nearby lakes, there usually resulted the death of many fish. Furthermore, the insects that the insecticide was created for build up a resistance over the span of a few years. Regardless of the amount of DDT used, it becomes ineffective in its job. Stronger chemicals are sought and the ecological balance is generally disregarded in the process.

Before the chemical pesticides became so widely used, natural predators helped keep the insects under control. Since man has stepped in with chemicals, predators have ceased to be effective in controlling the insects. Predators that do feed on the insects that contain insecticide are usually more seriously affected by the chemicals than the insects themselves. As the pesticide loses its effectiveness to kill the insects, man becomes more plagued by those which he first sought to eliminate.

We as human beings also suffer from the wide-

Perhaps the real seat of the environmental "overload" is the increasing number of people our earth must support. Recreational facilities are being taxed to their limits, and now even living space and air to breathe are scarce. The answer isn't easy.

spread use of chemicals. As we consume those foods that have been so modernly treated, we take in a portion of the chemical. Over a period of years, we build up deposits that become harmful to our bodies. In her book, *Silent Spring,* Rachel Carson stated that ". . . five, possibly six of the pesticides must be rated as carcinogens." Through research we now believe that this consumption of DDT does cause cancer, genetic damage, and interference with various other body functions.

I shall look forward to seeing increased restriction placed upon our many chemical pesticides. They have become more of a problem to environmental quality than an aid.

Among our common mistakes that we make against our environment is the vast problem of littering. I believe simple littering is the most profound form of pollution today. How many times do we carelessly and thoughtlessly dispose of some small item along the roadside each day? It seems that dirty air and dirty water are not enough. Everyone is constantly trying to do his part in covering this mainland with filth as well. In 1968 alone Americans polluted the land with 48 billion cans, 26 million bottles, and 1.8 million cars while we deposited 1,304 pieces of litter each month for every mile of highway. Though we have already established laws against such littering, it will be upon the individual himself if it is to stop. Otherwise, our state and others will continue to spend vast sums of money just to keep our highways clean.

Pollution comes to us in the form of noise as well as water, air, chemicals, and land. Through our highly mechanized and motorized civilization, we have produced the most violent and aggressive sounds our ears have ever known. Factories, automobiles, televisions, electric mixers, trains, and sonic booms are just a minute portion of today's inventions that produce anywhere from 50 to 140 decibels each day, 24 hours per day. High noise levels vibrate the entire human body; causing the eye pupils to widen, increases the flow of stomach acidity, narrows blood vessels, and incites violent headaches. We subject our bodies to extremely excessive noise and yet we are not fully aware of the harm. Our ears become so weak that they do not notice the towering number of decibels that make the body react in such strange ways.

It will do us no good to clean up all the other pollution if we will not be able to enjoy it with the senses we own. Some steps have been taken in an effort to limit human exposure to noise, but there needs to be more action taken. We've got to stop talking and start acting before it's too late to hear what we're talking about.

Population also is a vital factor in environmental quality. Environmental quality decreases as the population number increases. We have more people and that means we have more pollution, for it is man himself who pollutes. It becomes almost impossible to feed the entire population of the world as time progresses. As the population increases, the unemployment list lengthens. Educational quality loses its standards as we try to teach more minds than can be taught. Differences of opinions are more frequent, resulting in a climax of war.

With the world population now standing beyond three and a half billion, we must rapidly look for every available method of birth control. Planned parenthood should be practiced all over the world. Earth can support but a certain number of human beings and even a polluted world is better if it has a little room than no world at all.

In conclusion, I would like to state that my environmental quality is very dear to me. I have tried to show examples of how man has mistreated this fertile land so much. Our programs are now under way in the form of various organizations, but the most vital and important organization is the individual. Every member of this planet is going to have to organize himself and decide that, if he is to live here happily, he will have to assist in every way to fight against the decline of our environmental quality. ⬍⬍

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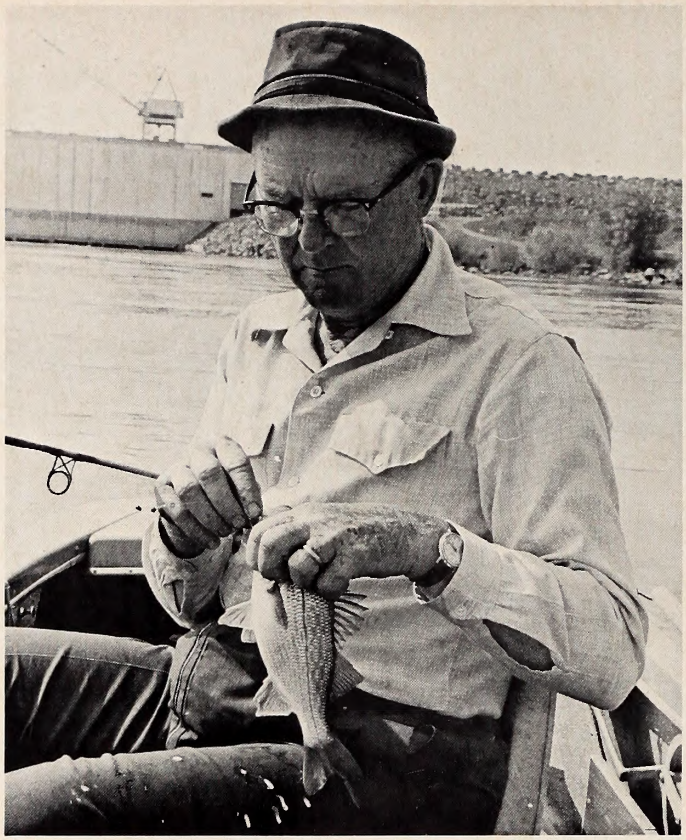


Have A Picnic With Panfish

by Jim Dean

PHOTOS BY THE AUTHOR

ABOUT four or five years ago, Dave Goforth of Greensboro showed me a trick that has probably done more to increase my angling success than anything I ever learned.

Dave is a lure designer, and he is also an excellent fisherman. I have had the good fortune to fish with him three times; twice for bass, bluegills, chain pickerel and crappie and once for white perch.

On all three trips, we used the same technique and we took plenty of fish.

Basically, Dave's technique is a compromise, and his reasons for developing it are sound.

"People have been feuding for years about whether you can catch more fish with natural bait or with artificial lures," Dave told me. "It is an absurd argument because there are obviously times when bait will outfish artificials and times when artificials will outfish bait."

"It occurred to me that some sort of technique which combined the best elements of artificial lures and the best elements of natural bait would be a real meat getter."

Dave designed a lure which is essentially a small spinner with a trailing single feathered hook. The spinner is very light and turns rapidly when the lure is retrieved slowly. To the small single hook, he attaches a tiny sliver of pork rind or short strip of fish. The result is a lure that not only looks good, but it also smells and tastes good to the fish.

On one of our trips, we fished for small white perch in the headwaters of Badin Lake just below the Tuckertown Lake Dam. During April and May, the white perch come into this swift water to spawn, and it is possible at times to catch as many as you want.

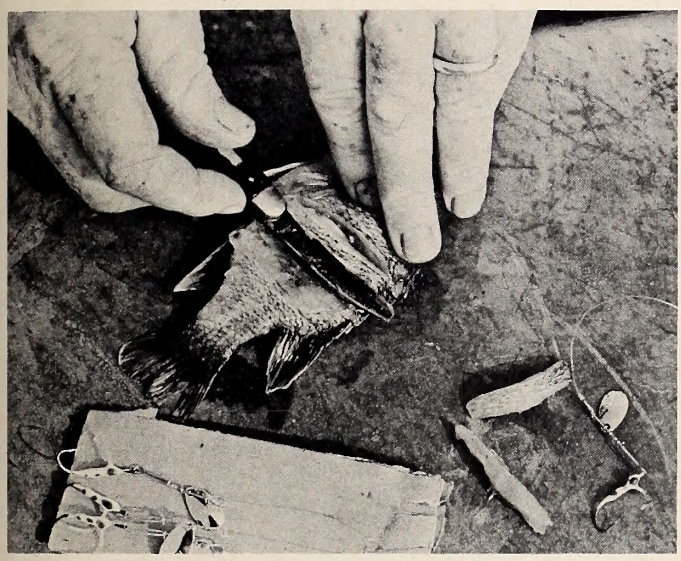
The day we tried it, the lake was muddy, and the fishing was apparently not up to par. The boats in the tailrace were having only scattered luck—that is until Dave and I arrived.

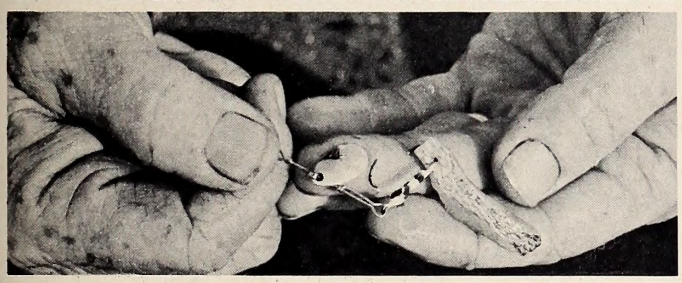
It was one of those days which all anglers cherish. We caught fish on nearly every cast, while the fishermen in the other boats slowly went nuts. Much to the despair of the anglers in the other boats, we also released most of our fish. I suppose we caught somewhere in the neighborhood of 70 white perch in about two hours. Most were about 10 inches long.

We tried other lures, but nothing worked as well as Dave's combination spinner and bait. I have experienced the same success with other species of fish across North Carolina in the past few years since Dave showed me his technique.

Although Dave has caught some hefty fish on his rig, it is at its best when used for panfish. Dave told me that he once took an eight-pound largemouth bass on the rig, but this was a considerable

At left, Dave Goforth unhooks another nice white perch that fell to the artificial lure with the natural bait flavor. This is but one panfish that finds the lure attractive. Shown in the two photos below, are the steps in preparing the strip of fish flesh that is hooked to the lure. It helps to scale the fish first before cutting the strips.





One key to success with the method described, is the light tackle used. The spinning gear should be of the "ultra light" variety if possible. Actually this not only helps present the lure correctly, but allows the fish to show off his fighting abilities.

feat because Dave's technique requires the use of ultra-light spinning tackle and four-pound test monofilament line.

The lures are too light for heavier line, and although I have tried using six-pound test line and larger, I didn't catch nearly as many fish.

Dave says that there isn't a fish that swims in fresh water that won't react favorably to his technique.

I believe him.

In the past few years, I have caught largemouth and smallmouth bass, crappie, bluegills, shellcrackers, walleye, trout, shad, white perch, raccoon perch, and maybe a few more that don't come to mind readily.

Unlike Dave, I don't use his technique exclusively. I like to catch fish using other lures and methods, and I also occasionally like to fish with natural bait. But I will have to admit that if I strike out using something else, I can usually count on some action using his combination spinner and fish strip or pork rind.

Dave's technique is simple, but you must follow it rigidly if you plan to get the most out of it. He uses ultra-light spinning tackle with a reel loaded with four-pound test line. When he first begins fishing, he usually attaches a small, forked pork rind (which you can buy at most good tackle stores). After fishing with this for awhile, he often switches to a strip of fish.

The method you use to attach the strip of fish is important. He cuts a strip about an inch long. It should be roughly triangular in shape. He threads the small end of the strip to the hook. If you hook the big end to the hook, the lure may turn, twisting the line. It also does not have as good action when the large end is attached to the hook. He also changes the fish strip frequently.

"If you don't change it frequently, it seems to lose some of its effectiveness," says Dave. "I think it's because the juices are washed out after you cast awhile."

Because of the light line, he can cast the lure long distances, and this is often an advantage. He also fishes it as slowly as possible without hanging up.

In ponds, particularly in winter and mid-summer, the fish are often deep, and a slow retrieve gets the lure down near them. I have seen Dave fish the center of farm ponds catching fish on nearly every cast.

I can attest to the fact that it is possible to get skunked using Dave's technique. It happens to all of us at times, but I'll also have to admit that I don't come home fishless nearly as often as I once did. ⬍⬍

Opossum: A Laboratory Animal?

by Clay Williams
Editor, *The Health Bulletin*
N. C. State Board of Health

This article is reprinted from the HEALTH BULLETIN, the official publication of the N. C. State Board of Health. The BULLETIN's purpose is to present news of agency activities, as well as

HALF-formed with undeveloped stubs for hind legs, a brain only partially complete, and many of its other organs just beginning to grow, the baby of an experimental laboratory animal emerges from its mother's birth canal late on a cold winter night.

Barely one-half inch long and 5/1000 ounce in weight, it wriggles blindly amid the forest of hair on its mother's belly, as it searches for a nipple the size of a pin head. Finding the nipple, it begins to nurse. Within a few days its jaws fuse so that the infant animal cannot release the nipple. In this state, protected from the outer world by a warm moist envelope of its mother's skin, it completes, over a period of 2½ months, much of the growth which in other animals takes place in the womb.

The animal, not a product of science fiction but an 80 million year old experiment of nature, is known to science as *Didelphys marsupialis* but better known to North Carolinians as the 'possum. Thrust into the world only 12 days after conception, it is sufficiently immature at birth to be considered a kind of naturally occurring "test tube" baby.

The smelly, hissing, nasty-tempered scavenger of Southern woods—reviled by man and given a wide berth by predators—has, in recent years, been accorded station with the rat, guinea pig and hamster as a laboratory model—thus, after a fashion, letting nature off the hook.

In studies being conducted by Dr. William Jurgelsky at the National Institute of Environmental Health Sciences, Research Triangle Park, this "abortion which has learned to survive outside the womb," is being developed as a powerful biomedical tool to provide a better understanding of how the developing fetus responds to harmful agents in the environment.

"Eventually its use may supplement standard techniques in the study of specific problems difficult or impossible to approach in the pregnant animal," Dr. Jurgelsky said.

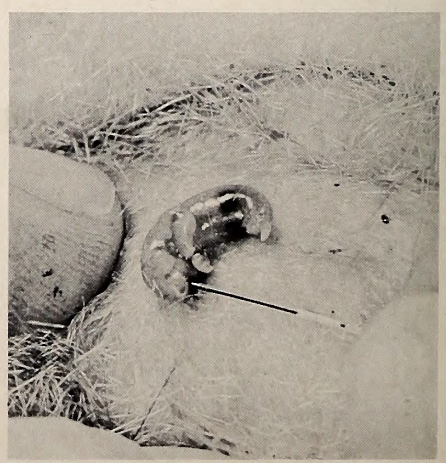
"The newborn opossum is much like a two-month old human fetus in its ability to serve as a unique animal model for testing the effect of suspected toxins on infant development," the research pathologist revealed.

"While it cannot replace the usual pregnant laboratory animals such as the rat or mouse in these experiments, especially in the study of the early stages of fetal development, the opossum's semi-embryonic state at birth does give it special advantages where direct studies on growing embryonic tissue in the later stages of fetal development are desired.

"The major advantage of the newborn opossum is that while still in part embryonic, it is in fact independent of its mother except for the milk it drinks and the protection of the pouch. A rat or mouse equivalent in maturity to the newborn opossum is only halfway through gestation and still in its mother's womb. To experiment on it, the investigator must either feed the test material to the mother, risking both damage to her and alteration of the material by her system, or he must remove the embryonic animal surgically, a very unnatural procedure which obviously cannot be repeated often on the same animal. In the opossum growing embryonic tissue is directly accessible

The tiny newborn opossum on the card at right is no bigger than a bee, and 13 of them will fit into a teaspoon. It will gain 1,000 times its weight by the time it leaves its mother at three months of age.

A plastic tube (scarcely larger than a thread) is placed in the baby's mouth which is also attached to the mother's nipple. Various drugs are thus fed to the young opossums.



specific developments in the field of dicine. The BULLETIN is published on monthly basis and is free. Address your uest to: THE HEALTH BULLETIN, N. C. te Board of Health, P. O. Box 2091, eigh, N. C. 27602.

simply by opening the mother's pouch."

In the series of experiments underway in Dr. Jurgelsky's laboratory, the newborn opossum is being used to gain a better understanding of childhood cancer, next to accidents the leading killer of children. Shortly after birth, the tiny opossums are given a single dose of potent cancer agent through a threadlike plastic tube inserted in their mouth next to the mother's nipple. As expected, the majority of the animals develop cancer of the brain within three to four months. But of these, Dr. Jurgelsky was surprised to find that a number also have birth defects, a rare coincidence in other laboratory animals, implying that the opossum may be an ideal animal to use in unraveling the long suspected relationship between cancer and developmental defects.

In a second investigation, Dr. Jurgelsky is using the newborn opossum to learn more about the manner in which toxins, entering the mother during pregnancy, damage the thyroid gland. "In most animals thyroid function begins in the womb where it cannot be studied without affecting the mother. The opossum appears to be better suited to this work because its thyroid gland does not begin to function until about one week after birth, when it can be studied independently of the mother. In one experiment a weedkiller, which has been shown to produce goiter and thyroid cancer in laboratory animals, is being fed to the newborn opossum at high doses in an effort to determine how it produces injury to the thyroid.

"The opossum newborn, because of its markedly undeveloped nervous system at birth, also appears to be an ideal animal model in which to investigate alterations in brain growth and function caused by exposure to environmental toxins during early growth. In a study in progress, opossums injected with one such agent, once per week from birth, develop spontaneous seizures. These seizures, which are similar to those seen in human epileptics, can be triggered in the opossum simply by gently raising and lowering the animal's front feet from the table top. The ease with which the opossum develops seizures in response to this toxin may make the animal of considerable value in understanding human epilepsy," Dr. Jurgelsky said.

Experimental work is only half the story of the opossum colony at the institute. According to Dr. Jurgelsky, experiments using newborn animals were not possible until a way was developed to induce the animals to reproduce in captivity in large numbers. Over the 83 years that the opossum has been studied scientifically, no one has been able to breed the opossum in the usual cages inside a laboratory. Successful breeding was possible only when small numbers of animals were allowed to roam freely in large rooms or outdoor wooded enclosures. Dr. Jurgelsky, who had unsuccessfully attempted to breed the animals in the laboratory over a three-year period during the course of his medical training at Duke University, soon found after coming to the Institute that the outdoor enclosures were not the answer.

His first attempt at breeding the animals in a small wooded enclosure during the winter of 1968 was also a failure—only a single litter consisting of two animals was born and most of the adult animals died from disease which could not be controlled under outdoor conditions. The following winter the pen size was increased to one acre, but again disease control proved impossible; in addition, Dr. Jurgelsky found that the time required to locate 60 females every day to check their pouches for young was overwhelming.

In a final attempt to salvage the colony in the spring of 1969, the persistant medical scientist housed the surviving animals in small cages constructed of wire mesh. The cages were placed in a wooded area in the hope that the animals, though caged, would respond to the natural surroundings. Under these conditions reproduction was surprisingly high. This approach appeared promising to the point that in the winter of 1969 concepts developed by Dr. Jurgelsky were incorporated, with the aid of the engineers of the Research Services Branch and the veterinarians of the Animal Science and Technology Branch, into the design of two new buildings, built especially for keeping opossums.

The buildings are essentially frame structures covered with screen wire and roofed in part with translucent material to permit maximum natural lighting. In the unique facility, 250 animals can be housed under sanitary conditions in individual cages featuring a flip top nest box and a walk through shelf. During the breeding season, from January to June, romance is encouraged by removing partitions between males and females. A technique similar to a "pap" smear is used to indicate when females may be receptive to courtship. The timing is critical, Dr. Jurgelsky pointed out, since a female not interested in motherhood will frequently kill the male in short order.

Last year the opossums at the Institute, maintained under the clean semi-outdoor conditions made possible by the new building and mated in a controlled fashion, produced approximately 70 litters of young—probably a world's record for opossums in captivity. Encouraged by this success, Dr. Jurgelsky and his colleagues are now attempting to develop a domestic strain of the animal.

Although it has taken 80 million years, Brer 'possum has finally been brought down from the persimmon tree and onto the laboratory bench. ▲▼

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Commission To Set Hunting Regulations June 7

The Wildlife Resources Commission will meet June 7 to establish the 1971-72 nonmigratory game and trapping regulations. During May the Commission held public hearings in each of the nine Commission Districts at which hunters and trappers were given an opportunity to express their views on the subjects involved. Most of these hearings were well attended, and proposed changes were discussed. Of particular interest were the proposed major changes which would create a new structure for North Carolina Game Lands. If this new structure is adopted by the Commission, full details will appear in WILDLIFE in the July or August issue.

Still Time

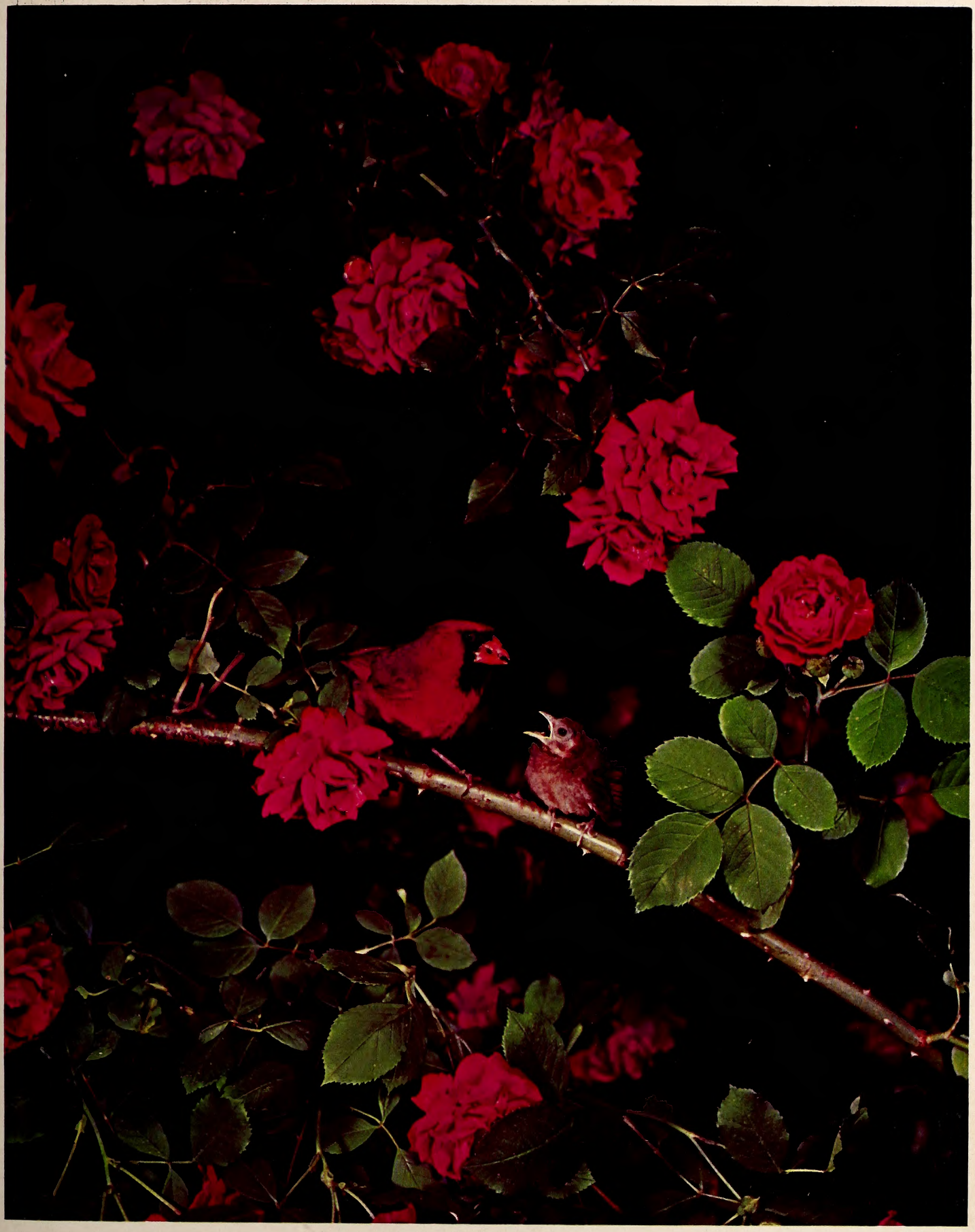
If you hurry, you still may have time to enter the big Bass and Rock Fishing Tournament to be held on Kerr Reservoir June 5 and 6. It's sponsored by the Henderson, N. C. Jaycees. Contest Headquarters: Tarheel Marina at Satterwhite Point, Kerr Reservoir. Hurry.

Waterfowl Carving Competition

If you're interested in waterfowl carving, decoy making, etc., you'll want to check into the World Championship Waterfowl Carving Competition to be held at the Civic Center in Salisbury, Maryland, June 19-20. For further information write: Ward Foundation, 707 Cooper Street, Salisbury, Md. 21801.

Saltwater Fishing Help

Two major publications are available to Tarheel anglers and boaters which should provide a wealth of information about saltwater fishing in North Carolina, where it is, how to get there, and where to stay. The "Coastal Fishing and Vacation Guide" is available from the Graphic Press, Inc., P. O. Box 26808, Raleigh, N. C. 27611 at $2.50 per copy. "Saltwater Sportfishing and Boating in North Carolina" is published by Alexandria Drafting Company, P. O. Box 5012, Alexandria, Va. 22305, for $5.38. These do everything but bait the hook!



The Cardinal

The Eastern Cardinal, ***Richmondena cardinalis cardinalis,*** was selected as our State Bird in March of 1943. In this summertime photo by Jack Dermid of Wilmington, the male is feeding the downy young amid the roses. The nest may not be far away, since the cardinal prefers briars and thickets as its home site. This photo was selected for this color bonus page with the hope that you will feel it deserves a frame.

North Carolina Power Companies Help

Wildlife Management In Action

North Carolina's power companies, here exemplified by Carolina Power and Light, are contributing to more and better wildlife habitat through power transmission lines plantings of wildlife food and cover.

A wildlife area averaging 70 feet in width and hundreds of miles long is one goal of a Carolina Power & Light Co. program underway in the Carolinas.

Using six crawler tractors, CP&L is reclearing the land beneath transmission lines. These lands can be developed into improved wildlife habitats or converted to agricultural use by the landowners.

This cooperative program, one of the first of its type in the country, began in 1964. Since then nearly 2,000 acres have been prepared for reseeding as a wildlife area or for agricultural purposes at the request of the landowners.

The tractors clear and disk the land. Following disking, a landowner, farmer or sponsoring organization prepares a seed bed and plants vegetation favored by wildlife.

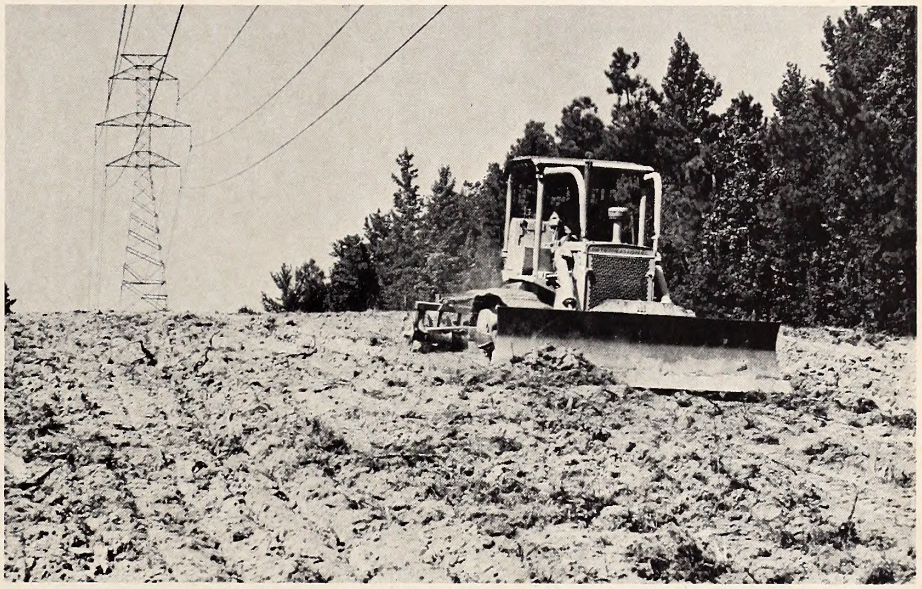
In its routine maintenance program, using careful conservation methods CP&L has also cleared thousands of other acres, which have been recovered with young native vegetation.

Cleared brush pushed to the edges of the right-of-way provides protection, and the fairly tall, but tender, resurging native plants provide cover and foodstuff that isn't as abundant in the older thick forests.

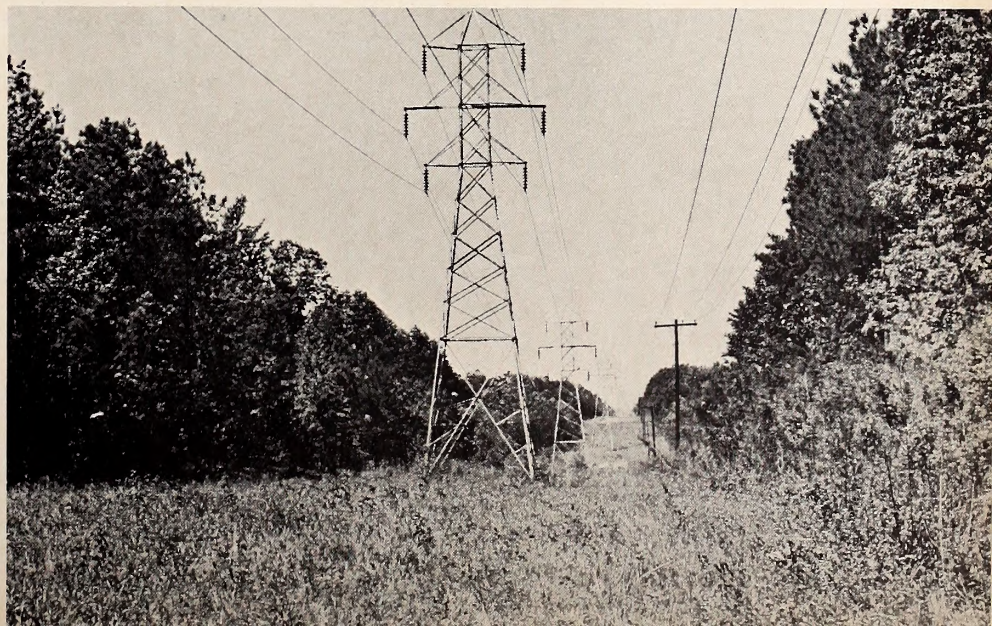
Quail, rabbits, songbirds, and deer where they are found, are the major inhabitants of the areas.

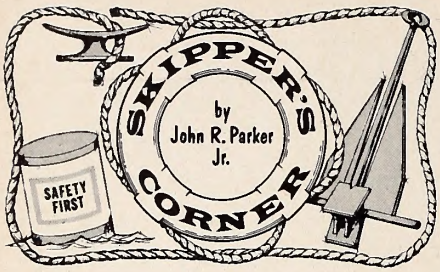
"Following development, you will find far more animal and bird life in or adjacent to the right-of-way areas than in the remainder of the surrounding forests," said Cliff Story, CP&L Forester.

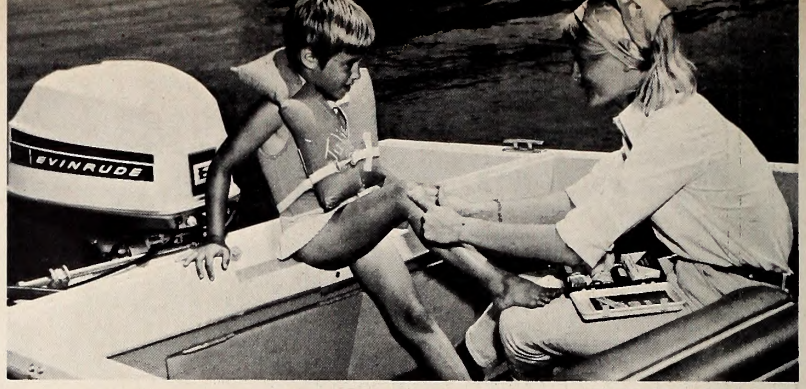
The power company is cooperating with the Soil Conservation Service, North Carolina Wildlife Commission, various hunting clubs, landowners and farmers in this unique conservation program.



Above, a crawler tractor prepares the land for future planting of wildlife food and cover plants. Left, a farmer sows land beneath C.P.&L. transmission lines, in a continuing program begun in 1964. The completed, flourishing planting composed of fescue, bicolor, and sericea lespedeza offers small game a place to feed, rest and nest.







EVINRUDE MOTORS PHOTO

Even a small "ouch" deserves prompt attention and a first-aid kit is standard equipment aboard the thoughtful skipper's craft. Safe boating means accident-free, injury-free boating; but be prepared.

ACTIVITIES of the organization responsible for boating safety programs should be of interest to the boating public. Of primary interest to you would be, of course, those activities of the state agency, the Wildlife Resources Commission. Also, of importance is the participation of the U. S. Coast Guard. North Carolina is one of several states with a great amount of coastal and inland navigable waters—those waters in which the Coast Guard shares responsibility.

As an example of what I have in mind, would you have guessed that Wildlife Commission officers made safety checks on almost 78,000 boats during 1970? That type of contact with boaters across the Tarheel State required thousands of man-hours on the water. Keep in mind that State Government has officially been in the boating safety business through its agency, the Wildlife Resources Commission, for over 10 years. The point is that you have some really experienced officers covering the waterfront. Among their many other duties, such as search and rescue, safety demonstrations, courtesy checks, etc., each officer occasionally finds it necessary to cite one of us boaters for violating the law. It is interesting that the most common violation involves the very thing (along with seamanship and common sense) that might save one's life. You guessed it, the life saving device or the lack of proper devices is what we are talking about. In order of frequency, we find also that: operating without registration, lighting violations (have you ever almost hit an unlighted boat? Frightening.), and fire extinguisher violations are common discrepancies. Other problem areas involve numbering, registration, skiing, warning devices and reckless operation, to name a few.

So much for subjects we had too often rather not hear about. Here is one of which we should all be proud: Boating fatalities in North Carolina decreased by approximately 45 percent in 1970 as compared with 1969. Could it be that we are beginning an era of safe boating in spite of the increase in boat sales, and boating traffic? Perhaps the efforts of thousands of conscientious skippers, boating education organizations such as the U. S. Power Squadron and the U. S. Coast Guard Auxiliary, combined with the efforts of boating officials are paying off.

Along the line of boating safety education, let me remind you to keep a weather eye out for notices concerning safety demonstrations and courtesy inspections to be performed this summer by officers of the Wildlife Resources Commission's Division of Protection. This relatively new educational effort by a state agency is beginning to reach and help thousands of boaters annually.

The U. S. Coast Guard's Fifth District Headquarters is also involved in something new. Fifth District, incidentally includes North Carolina, Virginia, Maryland and the District of Columbia. The District Office is conducting a study aimed at determining the life style of the American boatman. Of course, this study is not going to put any fish in the freezer or guarantee you good weather on each and every trip but some of what was learned may be interesting to you.

The Fifth District study showed there were about 1,850,000 users of recreational craft in the area at the time of the survey, which was completed last January. Some important indications of the Fifth District research:

- The two most popular boating activities are fishing and cruising. Boatmen spent 45 per cent of their total activity time on the water angling, and about 38 percent cruising.
- About 25 percent of all operators in the District are women.
- The most popular boat in use is the motorboat, with those under 16 feet comprising 34 percent of the total District fleet and those over 16 feet accounting for 45 percent.
- 20 percent of the boat operators travel over 50 miles to go boating. About 63 percent do their boating within one mile of shore, and about 3.4 percent reported that they operate most of the time in the Atlantic. Most of the District's boating activity takes place in Chesapeake Bay.

The method developed in making the Fifth District study will be incorporated into a new Management Information System being created by the Office of Boating Safety. The entire program will have automated procedures for collecting, processing and displaying data for evaluation and planning of Coast Guard activities.

"Safe Baating Week" Reminder

This column will offer more on Safe Boating Week in the July issue. For now, those boating clubs and organizations that wish to contribute to boating safety in the state through a demonstration, group gathering, etc., that week had better get busy as you have about a month. Safe Boating Week 1971: July 4-July 10. Remember the slogan: Safe Boating Is No Accident.

Water Skiing Tips

Water skiing depends on teamwork between the boat driver, the observer and the skier. These tips will help assure safety and fun through teamwork.

Hand Signals—Before starting out the skier, observer and driver should compare notes to make sure they understand the basic water ski hand signals.

Stay Alert—The driver's most important job is to remain alert at all times. Many times the skier is busy executing turns and tricks and does not see obstructions or congested areas looming up in front of him.

Starting Positions—The takeoff is the most important part of the water ski run. The driver should position the boat so that he will be able to follow a straight course. This will allow the skier to gain his balance before having to execute a turn.

"Hit It"—When the skier yells "hit it," the driver should have the line taut and ready for takeoff. Use enough throttle to make sure the skier is pulled quickly to the surface.

Turns—Avoid abrupt maneuvers. When turning, swing wide especially if the skier is on the inside of the turn. Never execute any maneuver that would allow an unreasonable amount of slack in the tow line.

Boating Laws—The driver, observer, and skier should acquaint themselves with state and local regulations governing water skiing.

Congested Areas—It's the driver's responsibility to avoid congested areas, piers and swimming beaches. It's also smart to avoid shallow water or weed choked areas.

Common Sense—In all situations not covered by boating laws, common sense is the guide. If the skier sees danger ahead, he should drop off. ⬍

Fifth Annual WILDLIFE PHOTO Contest

RULES

1. **Photagraphs taken in Narth Caralina, by North Caralina residents, which shaw any native Narth Carolina wildlife species will be eligible.**
2. **Eligible phatographs must:**
   - **(a) Be taken in Narth Caralina between August 1, 1970 and August 31, 1971 (nate extension)**
   - **(b) Be taken and submitted by residents of Narth Caralina.**
   - **(c) Shaw native Narth Caralina wildlife species (any animal, fish, bird, insect, etc.) General outdaar ar landscape phatagraphs shauld not be submitted.**
3. **Black and white prints and calar transparencies (any size) shauld be submitted. Da nat send negatives nar calar prints. Hawever, negatives af the 10 winning phatagraphs must be submitted an request.**
4. **DO NOT SUBMIT: (a) Prints ar enlargements mare than 8 x 10 inches in size; (b) Prints with retauching ar art work, ar prints made fram negatives with retouching or art wark; (c) compasite pictures, multiple printing ar mantages; (d) framed pictures; (e) calar prints af any kind.**
5. **Entrants shauld submit no mare than three phatagraphs each in each categary (black and white, calar). Each photagraph shauld be submitted as a separate entry and each entry shauld include with the submitted phatagraphs, the fallawing infarmation printed on the back af each phatagraph ar an envelape: (a) Name af entrant; (b) Complete address and zip cade of entrant; (c) Date phatagraph was taken; (d) Place phatagraph was taken; (e) Type of camera used; (f) Type af film used; (g) Shutter speed and f stop settings used (except far phatagraphs taken with box cameras); (h) Type of flash equipment used if phatagraphs were not taken with available light.**
6. **Cantest is apen only ta amateur phatagraphers. Na phatagrapher who earns more than $100 per year from phatagraphic pursuits will be cansidered an amateur.**
7. **All entries must be received na later than midnight September 30, 1971. Mail entries to: WILDLIFE PHOTOGRAPHY CONTEST, Wildlife Magazine, Bax 2919, Raleigh, Narth Caralina 27602.**
8. **The first ten photagraphs in the black and white categary and first three in the calar categary become the praperty af the Wildlife Cammission.**
9. **In each category the first prize is $25.00; secand prize is $10.00; third prize is $5.00; seven hanarable mention prizes af a subscriptian ta Wildlife magazine. The winning phatagraphs and hanarable mentians will be printed in Wildlife magazine.**
10. **Photagraphs will be judged by Wildlife magazine an the basis af photographic excellence, and the general appeal and interest af the subject. The decisians af the judges will be final.**

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Hunter's June

by Dr. R. Wharton Gaul
Charlotte

There really is no off-season for the duck hunter. There are hunts to be re-lived, gear to mend, and work to be done to assure that we will always have waterfowl. Such are the thoughts and actions in the hunter's June.

NOW the skies were empty. A warm June rain fell lightly upon the fields and waters of the Carolina coast. Warm fingers of Gulf air had long since pried loose the icy grip of winter, and sent the ducks back to their ancestral nesting grounds. Many of them had already paired off as the strange stirrings of the mating season began to grip them. Only the occasional black duck and gadwall remained in the marsh, mixing with a few waders, shore birds and other summer residents.

In a musty shack out back of the two-story frame house, the old timer puttered around with his decoys. A rack of spotless shotguns hung above his head, oiled and stored for the summer. Ropes, weights, paints, turpentine, oars, boxes of shells, all the impedimenta of the waterfowler stood piled about. His gnarled hands tugged at an anchor rope attached to a battered bluebill decoy, and finding it tight, he tossed it onto a pile of similar weathered frauds.

As he worked, his mind drifted back to a cold December day in the marsh, with the wind biting and sleet stinging his eyes. It was a day for bluebills. And they were there. Flight after flight of the small dark ducks buzzed his decoy spread, some pitching headlong into his stools. He had collected his limit in less than an hour, and spent the next hour just watching the constant drama of a salt marsh in winter. A marsh wren quarreled with him, then accepted his presence ungraciously. Redwing blackbirds chattered. A pair of black ducks swerved away violently as they realized the floating blocks were not of their ilk. All in all it had been a splendid day. A slow smile crossed his face as he picked up another decoy.

On this same June day, 2000 miles to the northwest, a hen bluebill swooped over a pool and sped away, several males in pursuit. Here in the great Delta Marsh, south of Lake Manitoba, redhead ducks, canvasbacks, bluebills and bluewing teal soared and dove in courtship flights. Lengthening days and rising temperatures saw every nook and cranny filled with the nests of many migratory species. A few mallard and pintail broods were already emerging and heading for water. Flightless males were collecting on sand bars, awaiting the growth of their new primaries. Many other species of waterfowl swarmed over the marsh in vari-

ous stages of nesting and moulting. All in all, a busy place.

Over in one corner of the marsh a flock of flightless male pintails found pie in the sky. Golden yellow corn gleamed in the bright sunshine. Quacking softly with excitement, the flock fed up the shore to a pile of corn near an elongated mound. Suddenly an explosion shattered the morning silence. A net shot through the air and settled quickly on the startled pintails. All their frantic struggles availed them nothing. From behind a nearby pile of brush two men came up to the net and began to extract the frightened ducks. One wore the mark of Ducks Unlimited-Canada, and the other was a wildlife biologist at the Delta Marsh Station. They were banding ducks as part of a cooperative wildlife research project. As each duck was banded it was gently released, alarmed but none the worse for the shock. These men and others like them were putting in long days at this time of year. Banding, nest counts, transects and brood counts, and water level measurements filled their notebooks. Each day saw the information grow until by late summer the status of continental waterfowl would be known. Then the next stages in the long task of building up populations to the levels of the 1950's, and perhaps even higher would be clear. Hunting seasons and limits would be set to allow the taking of the harvestable surplus. And as the autumn frosts approached, the long migratory flights would resume.

The old duck hunter was already dreaming of the coming season. He stabbed his paint brush into the white paint and delicately outlined the wing of a female bluebill decoy. Later he would mix lampblack with brown and repaint a handful of over-sized black duck decoys he had used for more years than he cared to remember. Only a few of these were required, as the black, wariest of them all, wouldn't look twice at a spread of several dozen of their kind. In these parts they just aren't that gregarious. In his mind's eye, the old timer saw a pair of blacks reaching for water with their wings set. Again he smiled to himself. 100 yards away a didapper dove beneath the water of the little bay. Farther out a mullet jumped.

In the northern part of the Province of Quebec, the George river flows into Ungava Bay. Beginning deep in the interior of Labrador, it gathers force as it heads north until it becomes one of the major waterways in that part of the country. In a small backwater where one of its many feeder creeks enters, a female black duck had hidden her carefully prepared nest. Nine oval treasures lay hidden in its down. As we join her, eight of them have hatched and the ninth, being sterile, would fall prey to a rat. Unable to wait longer for the tardy one, she led her brood to the water. There, as the lengthening days passed, they would learn to swim immediately, and later to fly as their feathers grew. One of them would fall prey to a pike, and another to a bald eagle. Still another would barely escape the clutch of a snapping turtle, nor would it ever forget the experience. Farther downstream, the flightless males gathered together even as their peers in the Delta marsh had done to await the growth of new flying feathers. Suddenly, out of the woods appeared a black dog. It bounded up and seized one in its jaws before escape was possible. The gentleness, yet firmness, with which it held its victim would have to be seen to be believed. Turning, it re-entered the woods and approached its master. The biologist took the duck, ruffled the labrador's ear, said "Good boy, Dutch, get me another," and proceeded to band the black duck and release it. By keeping this up for several weeks during the flightless period of the males, encompassing late June and July, he was able to band several hundred ducks. Among them was the father of the brood. His band read 200-4357, plus an address. And the summer passed.

The old timer stacked his decoys in neat piles according to kind. The paints were once more on the shelves, the cords coiled on their spindles, the anchors boxed, and the tools hung from their hooks. Summer was passing and the days already shortening. The blind was receiving needed repairs, and even the boat sported a new coat of dull brown paint. The September line storms would signal the end of summer, and a few teal would begin to drop in. Amidst a growing excitement, the hubbub of late summer was ignored. Tourists could come and go, but the old man's time was not yet. There would come a day when the bluebills would decoy, including a flight from the Delta marsh. And on another day, a black duck would fall, later to grace his table. On its leg would be a bright ring of metal, 200-4357. The old man and the duck would have made their rendezvous . . . the wheel doth come full circle. ⬍⬍

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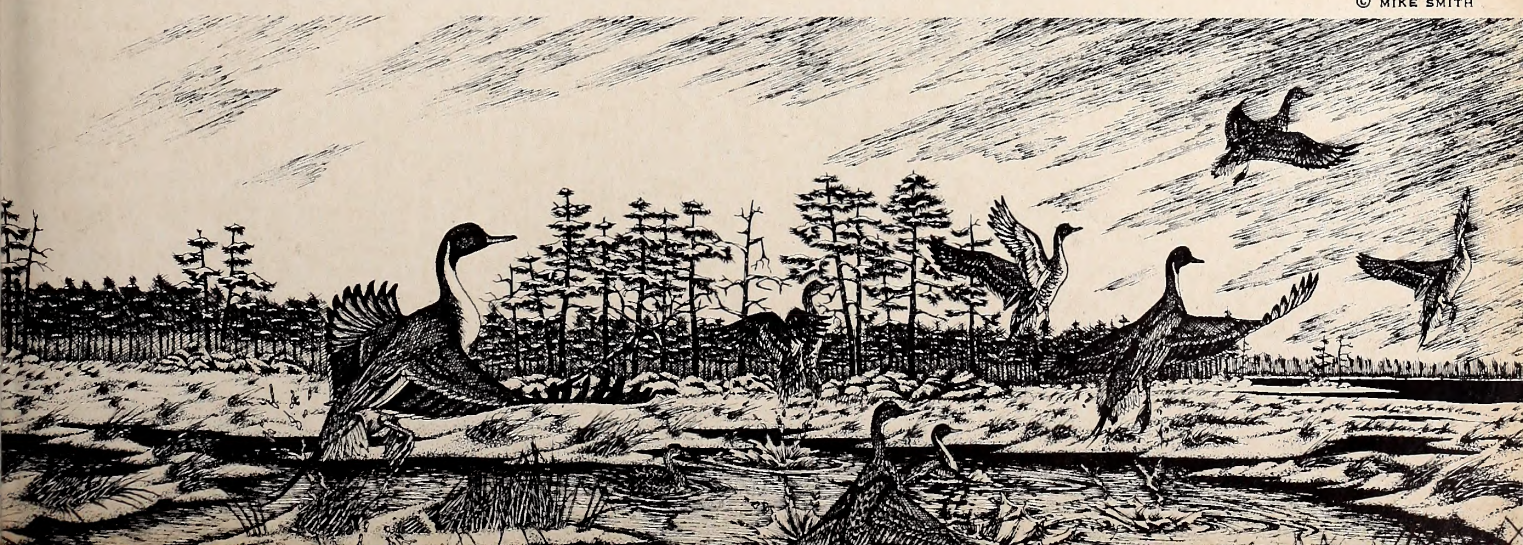


The Way of the Buffalo

by Roy Martin
Greensboro
PHOTOS BY THE AUTHOR

THERE is a dragline at work in South Buffalo Creek near Greensboro and its progress could spell fish for one of North Carolina's most grossly polluted waterways.

"In my opinion," said Ray Shaw, superintendent of water and sewer for the City of Greensboro, "it will be four years at the most and three years at the least before we have fish."

"Dredging is an important first step."

The project is a joint effort between the city and Guilford County. It began last August and progressed intermittently during the winter months because of weather. More intensive work was expected during spring and summer.

The South Buffalo rises west of the city near the Greensboro-Winston-Salem-High Point Regional Airport. It flows about 20 miles around the eastern fringes of Greensboro and merges with the North Buffalo Creek to form the Buffalo. The Buffalo Creek flows into Reedy Fork Creek which empties into Haw River.

For more than 40 years, the function of South Buffalo Creek has been to carry waste away from the City of Greensboro. Before 1929 when the South Buffalo Treatment Plant was opened, raw sewage was dumped into the creek.

And industry has contributed to its corruption. Only in about the past four years have firms in the heavily-populated industrial community in Guilford County made visible efforts, under pressure of the citizenry and government, to curtail the dumping of their industrial wastes.

Part of the problem has also been the creek itself. South Buffalo is a waterway of low volume flow, only an average of 25 million gallons per day.

In critical stages, the flow volume drops to one million or two million gallons per day. Simply, it has been unable to assimilate the volume of human and industrial waste dumped.

The result has been a fishless—completely dead—stream.

"There hasn't been a fish in that creek in over 40 years," reported a McLeansville storekeeper who grew up on the banks of the South Buffalo. "And I remember not so many years ago seeing about a dozen head of cattle dead on the bank near here. They had gotten out and gotten to the water."

The South Buffalo has long been a focal point of controversy. Pollution is so acute that the absence of fish life may be one problem but to those who live nearby, there is nothing quite so awful as the smell.

Residents adjacent to the stream have complained that in the summer, particularly in hot and slightly windy conditions, it is nearly impossible to stand the odor of South Buffalo. And it has been claimed that the odor is so strong at times as to cause paint to peel off buildings several miles from the creek.

Many North Carolina communities are faced with problems similar to this one described in Greensboro. Make certain yours is preceded by thoughtful deliberation, and that the action taken is in the very best interest of the total environment. The correct answer isn't always the easy one.

Guilford County Environmental Health Director, Owen Braughler, is an advocate of the dredging of South Buffalo. He believes that the progress thus far is significant and contends reclamation is definitely possible.

"They've got the water down a foot and there's free flow," Braughler explained. "You can see it flowing and that's something we've not seen before."

The dredging operation is located in eastern Guilford County north of the US 70A bridge in an area where there is a natural fall in the creek bed. Braughler said the dredging will pick up the pace of the flow and subsequently increase the oxygen content of the water.

"I am very pleased with what I have seen down there," he advised. "Where they have cut the channel you can even see ripples."

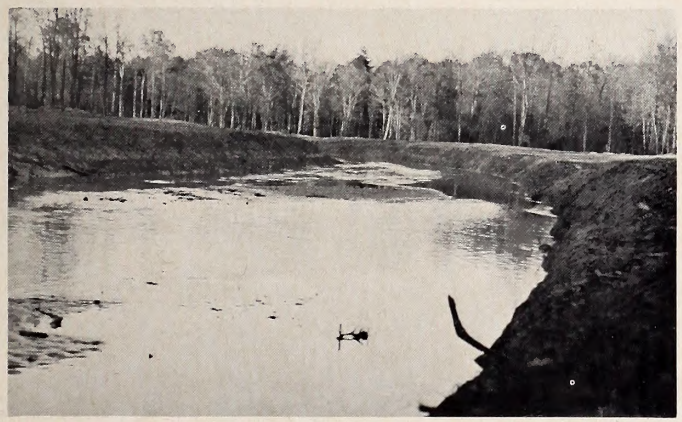
The total cost of the project has not yet been determined nor has there been any termination date or point established. A similar, but unfinished dredging project on the South Buffalo in 1963, involved the county paying $2 per hour for each piece of equipment working and the city, using its own equipment, doing the job. That arrangement is expected to be used again.

Braughler is emphatic about the dredging.

"I think there is hope that this stream can be reclaimed to the degree that it will no longer be unpleasant for those living in its vicinity," he declared.

"I think there's some improvement down there right now. And those people who live nearby have been very patient. They have every right not to be."

What is the proper course of action for South Buffalo Creek? Is complete dredging the answer? What will be the far-reaching effects? Really what is best for this portion of our natural resources?



But the dredging of South Buffalo is not without opponents. The most vocal is Professor R. C. Ward, a biology instructor at Guilford College and adament environmentalist.

"It will simply destroy it," he said. "It will no longer be a creek, only a ditch."

Professor Ward and his students, members of the Biophile Club at Guilford, have conducted extensive experiments on South Buffalo.

Many have traced its course on foot. They know it practically and scientifically.

Ward argues dredging will ruin chances of reclamation of the waterway. While Superintendent Shaw pushes the concept of obstacle-clearing for the sake of increased velocity and an ultimately higher oxygen content, the professor strongly disagrees.

"Dredging makes water flow too rapidly," Ward declared. "It's rushing water to the sea."

According to Ward, dredging all but eliminates "the meanders" in the stream. The naturally-crooked course is straightened, increasing the velocity of the water. The water level thus decreases because more water flows downstream because of the clear, straight route.

He said he and his students have recently tested South Buffalo water for the oxygen content reading.

"It's not appreciably increased because of the dredging," he asserted.

As for fish, Ward believes there's no chance.

"With the dredging, there is no bank protection for the fish. Steep sides are created, leaving insufficient protection of banking."

"There is no way for a fish to take refuge. He is constantly fighting the currents to keep from being washed away."

There is only one way, he said, to reclaim South Buffalo Creek.

"They can take aerial photographs, see how it used to be shaped, put the dredging back to work and put it back like it was," the professor said, also advocating a series of dams which would recreate the effect of "meanders" which might offer protection for future fish life.

"Water is a resource," he said "and we simply have something better to do with it than rush it to the sea."

Superintendent Shaw, who received many of the movement's verbal and written (letters to the editor) blows, is equally adamant in defending the project.

He believes it is a vital part of a two-pronged attack on the pollution of the creek. The other approach is the upgrading of the South Buffalo Sewage Treatment Plant. In short, Shaw thinks the two programs will bring fish back to the creek and alleviate the odors.

Some improvements have already been made to the treatment plant, which empties an average of eight million gallons of treated waste into the stream each day. That involved $100,000 worth of new aerators. A successful bond issue last November will provide $1 million for more extensive modifications. Work on that phase is expected to begin in 18 months.

Shaw's concept of the benefits of dredging go back to obstacle-clearing, "removing the dams which have been built by nature, man and animals and which have caused ponding and stagnation of water in the creeks."

"By dredging and clearing away overhanging foliage," Shaw explained, "we open it up and increase the velocity of the water and give the creek access to sunlight and air. It will simply be in a healthier condition to do what it has to do—assimilate treated waste."

South Buffalo is now designated by the North Carolina Department of Water and Air Resources for the usage. It is currently unclassified but is expected to be given a "D" rating—the lowest—by the State Water and Air Resources Board. Public hearings have been held and the designation is expected soon.

"We don't think that what we are doing is detrimental to ecology," explained Shaw. "Supposing you lost a leg. A doctor would equip you with an artificial limb. He is thereby helping you to do something that nature can't help you do."

That, according to Shaw, is the essence of the matter.

"Stream reclamation by dredging is nothing new," he asserted. "Our people who've been dredging there have already seen minnows in the water."

"I see that the South Buffalo will be reclaimed for fish," Shaw declared. "We've got to get the food chain established and I think we are already into that.

"It's not going to be any trout stream, but there'll be fish in it." ▲▼

Dissatisfied with simply "talking" about our decaying natural resources, Troop 326 did something about it. At left, Tim Quinn, John Leazer and Thomas Swanson, display part of the results of their efforts early last spring.

The endeavor was well planned, and took a lot of work by everyone concerned. It involved a chilly hike, an early spring camp, and careful seamanship under the watchful eye of interested leaders.

Operation WOOD DUCK

TROOP 326, all fourteen strong, decided that there had been enough talk about "ecology" and now was the time for each individual to be held accountable for our natural resources and wildlife. After serving on several clean-up projects, we contacted the Wildlife Commission and the Department of Zoology at North Carolina State University to try to determine what contributions we could make in this area. Dr. F. E. Hester, Professor and Director of the North Carolina Co-Operative Fishery Unit from the Department of Zoology, visited our troop and discussed wood duck conservation. He showed slides and a film on this subject. It was then decided that we would construct some wood duck boxes, and we were able to receive blueprints and specifications from both the Wildlife Commision and the Boy Scout Office.

We next secured the proper type of lumber needed which was donated by a cabinet company and parents of the scouts. At our regular scout meetings for the next several weeks we were able to construct twelve wood duck boxes. After completing the boxes, it was then necessary for the troop to find a pond or lake that would be sufficient for wood duck reproduction. We were able to do this through Mr. N. D. Burwell who has supported us in this project and allowed us to place the boxes in the head of Austin's Pond in Johnston County.

On March 20, the troop embarked on a combination camping and wood duck box project. After hiking to within 100 yards of the best location for these boxes, the troop set up camp and prepared a pot of stew. After lunch, each scout participated with an adult in the proper placement of the boxes and preparation of the nest. It is with much anticipation that we look forward to following our project and testing the results. Overall, this project has been a very exciting event for this small scout troop, as they can see with some effort and planning that we can make things happen to protect the resources and our wildlife.

Scout Master—
Mr. E. H. Aull
Assistant Scout Master—
Mr. H. Lee Swanson

Ding and the Doodled Duck Stamp

Three cinnamon teal will grace the 1971-72 Federal Duck Stamp —the work of artist Maynard Reece of Des Moines, Iowa. It will be Maynard's *fifth duck* stamp, and was chosen from 191 entries.

The nation's first Duck Stamp was drawn by another Des Moines man, the late Jay N. "Ding" Darling, the famous conservationist-cartoonist who was Chief of the U. S. Biological Survey in the mid-1930s. And therein lies a story that has never been told.

The Duck Stamp Act was passed about six weeks after Ding had gone to Washington in March, 1934. With it came an urgent deadline. Under the new law, no hunter could shoot waterfowl that Fall without a Duck Stamp. But there was no Duck Stamp, and there was little time to create one.

First, there was the problem of finding a suitable design. It would then take the Bureau of Engraving at least six weeks to engrave and print the stamps—after the Bureau had been authorized to do so. Then all postmasters had to be instructed about the new law, and the stamps had to be distributed to all post offices. All of this had to be done well ahead of the duck season. Colonel Hal Sheldon, head of public relations of the Biological Survey, came to Ding with tears in his eyes, waving the time schedule. He didn't see how the deadline could be met. Besides, no one had the faintest idea as to what a Duck Stamp should look like.

Neither did Ding, but as a top cartoonist he thought he could help. That night, on six sheets of cardboard, he made some sketches of Duck Stamp layouts. He handed them to Sheldon the next day, explaining that they were only rough ideas.

A week later, when Ding asked Sheldon about the Duck Stamp project, the Colonel replied: "Oh, the Bureau of Engraving has selected one of your drawings and is already at work on it."

Ding erupted. Years later, he wrote us:

"I could have murdered Colonel Sheldon and all of the Bureau of Engraving, and every time I look at the proof design of that first Duck Stamp I still want to murder them—but it was too late to recall the design and make a new one."

And so a hasty sketch of two mallards coming in for a landing became the first Federal Duck Stamp. But although Ding deplored it, the stamp had a rough strength that fit the new program well.

Don't Eat Shaggy Manes!

Since the May *Wildlife* magazine came out, word has been received that the shaggy mane mushroom (page 18) can be "poisonous" during certain stages of its development. Also, any consumption of alcohol before eating the shaggy mane may enhance the likelihood of becoming ill.

We May Be Here To Stay

A Rockville, Maryland resident may have established some sort of record for something or other when he subscribed to *Wildlife* magazine for 25 years in April. Let's hope that we have some wildlife to write about in 1996!

Wrong Collector

Word was received from R. G. Lytton, Jr. of Lake Waccamaw that the fossil collection attributed to him on page 12 of the April issue actually belongs to his son, Rome G. Lytton, III. Although only 14, he has been collecting fossils for the past five years.

Questions and Answers

Starting next month, *Wildlife* will run a page of frequently-asked questions about the outdoors, and the answers (if we can find them!). We hope that our readers will send in such questions, although it is doubtful that we will be able to use the name of the writer. Send us yours.

New Forest Supervisor Announced

Del W. Thorsen will be the new Forest Supervisor of the National Forests in North Carolina, succeeding the late Ralph Moyle, T. A. Schlapfer, Regional Forester, announced in April.

Del comes to his new job with more than 30 years experience with the Forest Service. His most recent assignment has been as Forest Supervisor of the Francis Marion-Sumter National Forests in South Carolina.

Thorsen is a native of Minnesota but most of his career has been spent in the South. He has been a District Ranger, Staff Specialist in the Regional Office, Deputy Forest Supervisor and Forest Supervisor. He was in charge of the National Forests in Alabama before going to South Carolina.

1971 Camping Directory Issued for National Parks

Publication of the 1971 edition of "Camping in the National Park System"—a comprehensive guide to camping facilities and services provided by the National Park Service—was an-

nounced recently by Secretary of the Interior Rogers C. B. Morton.

The new directory lists nearly 28,000 campsites at 529 campgrounds in 83 areas of the National Park System. The booklet specifies the camping season for each area, duration of stay permitted and facilities provided by the National Park Service or park concessioners. Each area is numbered and keyed to a map in the directory.

Individual campsites are available on a first come, first served basis with no reservations accepted. Designated group campsites, however, may be reserved for schools, organizations and other large parties.

Campground use fees, ranging from $1 to $3 per night per campsite, are charged for improved campgrounds. There is no charge for back country camping.

The $10 Golden Eagle Passport, on sale at entrance points to most park areas and through other Government and private agencies, will admit the purchaser and others in his private automobile to parks and other Federal recreation areas where entrance fees are collected. This annual entrance permit is valid through December 31, 1971.

"Camping in the National Park System" can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402 under catalogue number I29.71:971 for 25 cents a copy.

Vehicle Kills Three Deer

Sunbury, N. C.—On April 1, four deer that were crossing U.S. 158 near Roduco, tangled with a tractor-trailer truck, and came out the worse for their experience. Three of the deer were instantly killed, and the fourth was injured and fled into the woods.

N. C. Wildlife Protector John Savage said in his 15½ years with the Wildlife Commission he has never heard of as many deer being killed at once in such a collision. He said he has confirmed reports of nearly 400 deer being killed in such accidents in his assigned area during these years.

★ ★ ★ ★ ★ ★ ★

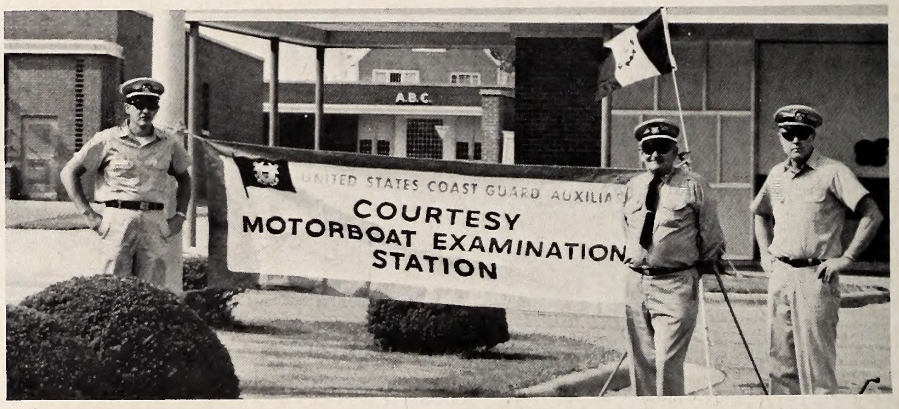
KNOW YOUR PROTECTOR

Robert B. Patrick, Jr.

Wildlife Protector Robert B. Patrick, Jr. was born November 13, 1944 in Columbia, N. C. He is the son of the late Robert B. Patrick and Mrs. Elsie Ogle of Hampton, Va.

Robert graduated from Columbia High School and completed a four year enlistment in the United States Coast Guard. He completed the three weeks Basic Recruit School and the Basic In-service School for wildlife protectors at the Institute of Government at Chapel Hill. He was employed as a Wildlife Protector Trainee November 1, 1969 and was stationed in Pitt County. On March 5, 1970 he was transferred to Scotland Neck in Halifax County as a Wildlife Protector.

Robert is married to the former Barbara Rhodes of Columbia and they have one daughter, Lisa Dawn. The Patricks are members of the Albemarle Church of Christ.



Courtesy motorboat examinations are frequently conducted by units of the Coast Guard Auxiliary, and Winston-Salem's Flotilla 93 responded with several last season. Manning a Greensboro examining station were (left to right) A. Slater, FC-93; R. Krepps, SO-IX; and T. Earl. Watch your local newspaper for this year's events.

Psalm of the Trees

IN sunny places, like pastures, I grow;
my sharp thorns and tiny bright red apples
dub me the Hawthorn or thorn apple tree.

ALONG fences and roadsides in sunshine
I look like an Indian in war paint
when I put on my cloak of fall colors;
long ago Indians and pioneers made
Indian lemonade from my berries,
and I became known as the Sumac tree.

ON the mountainsides I stand and tremble;
beavers and elks like the taste of my wood
and I shiver at the thought of their bite;
my leaves whisper in summer and autumn
and I, the Aspen, am never quiet.

AUTUMN brings my moment of grandeur
with three shapes of leaves orange, red
and yellow!
and I swim around in Sassafrass tea.

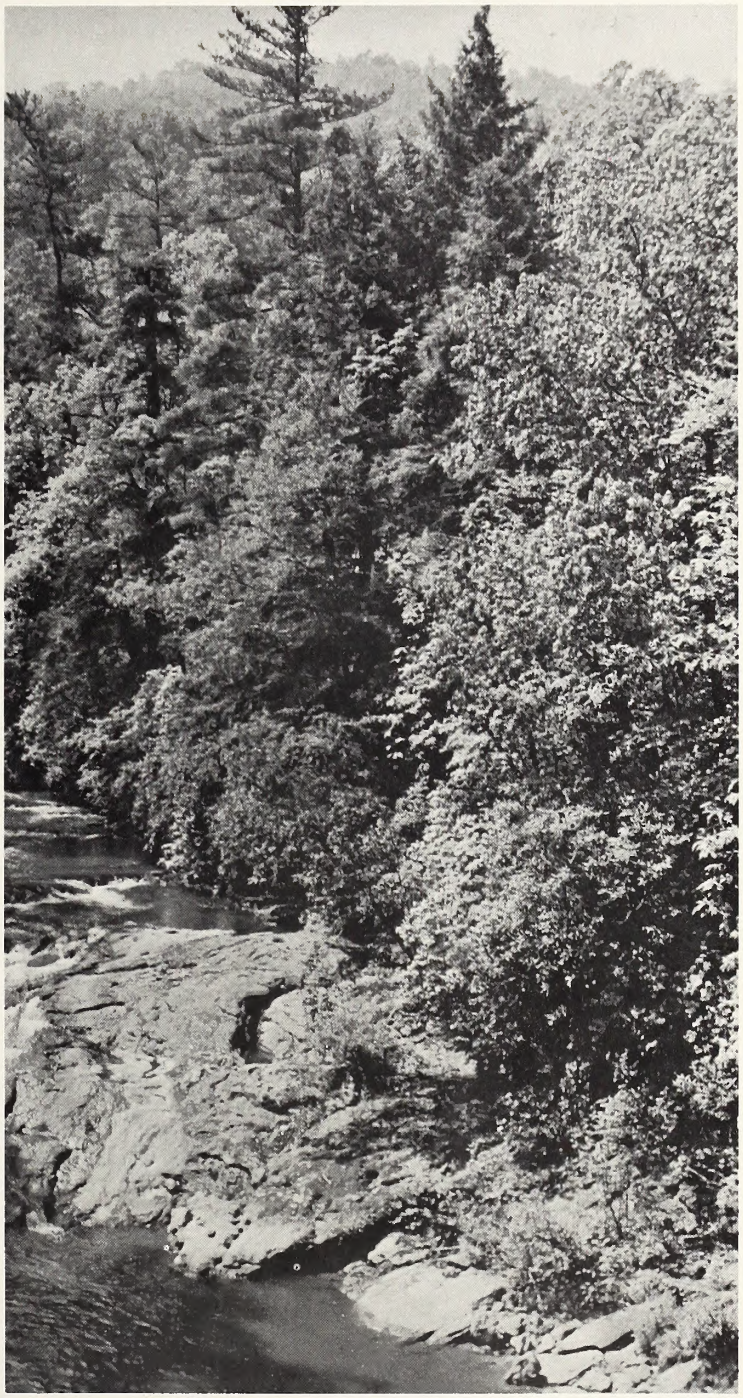
IN the shady forest my roots spread flat
and ferns and moss like to grow around them;
little animals and birds eat my fruit
and my smooth grey bark marks me the Beech.

THOSE who seek the shade like my umbrella
and although my leaves are lopsided,
my virtue is my patriotic name—
of all elms, I am an American.

TO those who seek strong wood I am victim
for the Shagbark Hickory is sound;
my buds are touched with lavender, rose
and gold,
and I yield nuts of a delicate flavor.

IT is my honour to be the State Tree
and as a spokesman for all my fellow Pines
and other trees wherever they may be—
Have mercy upon us; preserve a tree!

—Josephine M. Upchurch



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Zip Code_____

IMPORTANT:

Enclose present Address Label

Please notify us promptly of change of address.

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No stamps, please

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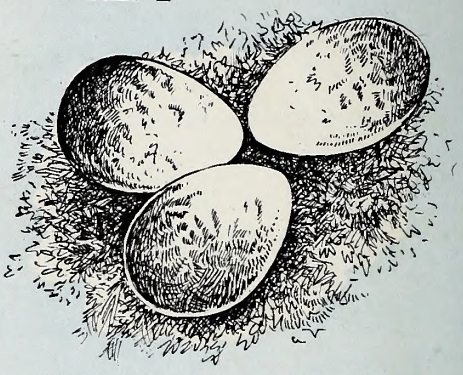
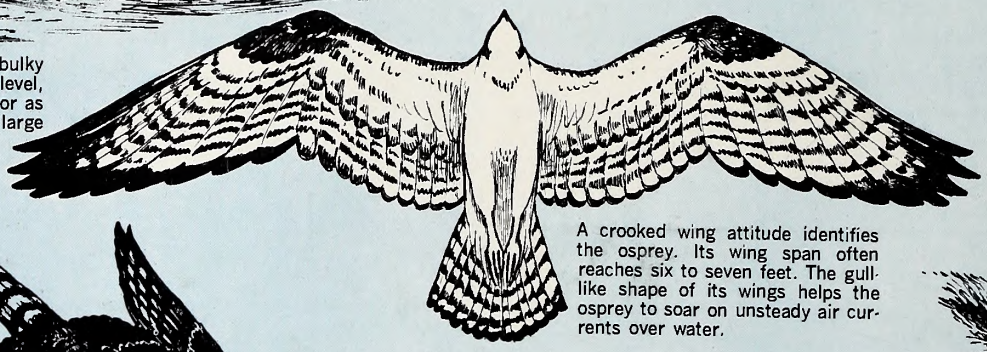
Please notify us promptly of change in address.
If renewal, please send in address label.

OSPREY

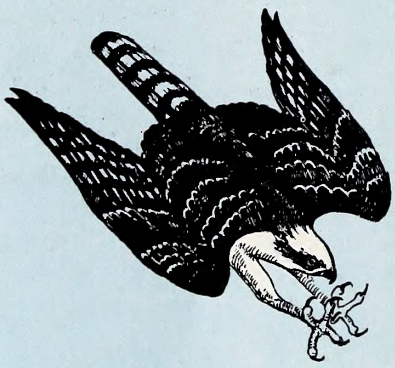
Osprey nests are very large, bulky structures, placed at ground level, low to the water as shown, or as much as 90 feet high in a large dead snag.



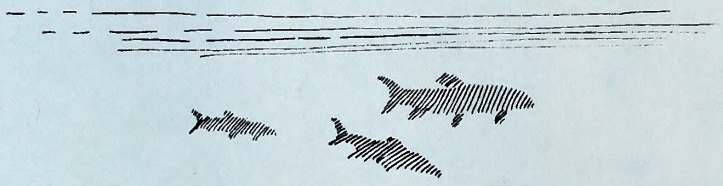
The osprey lays two to four eggs splotched dark chocolate brown over a yellowish cinnamon color.



A crooked wing attitude identifies the osprey. Its wing span often reaches six to seven feet. The gull-like shape of its wings helps the osprey to soar on unsteady air currents over water.



The osprey's feet have a reversible outer toe and are covered with spiny barbules. Together with great curved talons, an osprey's feet are especially well adapted to holding its thrashing catch. Once airborne, the osprey will shift its catch to face head into the wind, presumably for least wind resistance.



Its dive for fish will often carry an osprey completely under water. An extremely long reach helps lessen the distance to its prey.

r. jenkins

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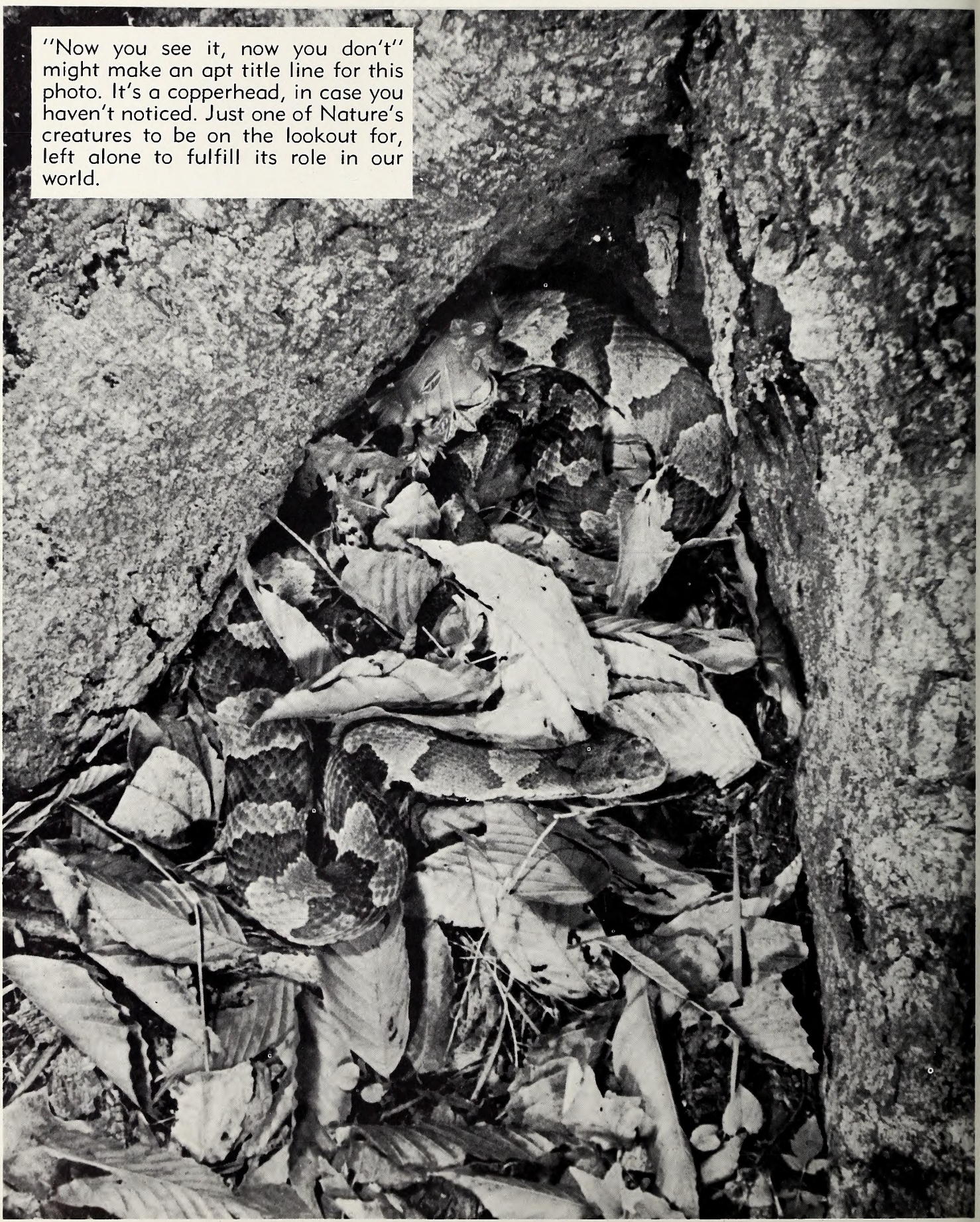

"Now you see it, now you don't" might make an apt title line for this photo. It's a copperhead, in case you haven't noticed. Just one of Nature's creatures to be on the lookout for, left alone to fulfill its role in our world.

PHOTO BY KARL MASLOWSKI

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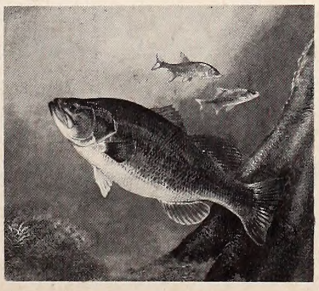
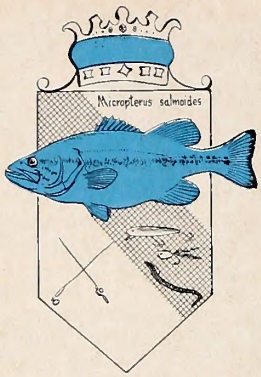


There's nothing really predictable about the largemouth bass unless it is that he is unpredictable. The bass does furnish about as much great fishing as any other game fish we have in fresh water. They come in assorted sizes, with the top around 15 pounds for North Carolina. The largemouth makes himself at home in a wide variety of waters. Painting by Duane Raver.



The Largemouth Bass

by Duane Raver

YOU may have met the largemouth bass on the end of a bait-casting outfit far out in a mountain reservoir in western North Carolina, or swirling at a popping bug in a Piedmont farm pond. Perhaps your first encounter with "Mr. Bigmouth" was at the edge of a reed-lined coastal sound with spinning tackle. Any of these meetings is possible since the largemouth is widely distributed in all sections of North Carolina and is found in a variety of waters. Perhaps more anglers fish for largemouth bass than for any other inland game fish in North Carolina.

The bass' popularity as a game fish is justified, although some anglers who have encountered unusually lethargic individuals will have some derogatory comments to make. Even a fine sportsman like the largemouth can't please everybody. The best way to judge the fighting qualities of this fish is to tie into a three pounder on light tackle and then decide for yourself. This holds true for the eating qualities of the largemouth, where again you have to make up your own mind after eating a properly prepared specimen. Most anglers who are devoted followers of this unpredictable fish rate him high, both as a worthy opponent on the line and a succulent morsel on the table.

It comes as something of a surprise to many fishermen to learn that the "largemouth bass" is not a bass at all but a sunfish. The largemouth, and his first cousin, the smallmouth bass, are important members of the family Centrarchidae, which also includes the bluegill sunfish, the pumpkinseed, the crappie, the warmouth, the robin, and several smaller sunfishes. The scientific name of the largemouth bass, *Micropterus salmoides,* is somewhat descriptive and means a salmon-like fish (*salmoides*) with small fins (Micro-pterus). This, perhaps, has given rise to one of the largemouth's nicknames of "trout." Also included among its many aliases are "linesides," "green trout." and "chub."

Most fishermen should have little trouble in distinguishing the largemouth bass from even its closest relative, the smallmouth, when the identifying characteristics are kept in mind. The spinous dorsal fin of the largemouth bass is almost entirely separated from the soft dorsal fin; while, in the smallmouth, these two fins are obviously connected. The upper jaw of the largemouth extends beyond the back of the eye when the mouth is closed; in the smallmouth, the upper jaw extends only to about the center of the eye. The scales of the largemouth bass are quite large and conspicuous; but those of the smallmouth are rather small and almost indistinguishable on the lower cheek. One of the surest methods of identification is the number of rows of scales on the cheeks. The largemouth has nine or ten, but the smallmouth has about 17 rows.

Color varies in the largemouth from almost black through various shades of bronze-green to pale greens and yellows. However, a distinctive dark band, or series of blotches, is usually present down the midside of the largemouth bass. The average size is under five pounds, although many over ten pounds are taken annually in North Carolina.

Habitat

The nabitat tolerances of the largemouth enable it to survive and do well in slightly brackish water, both acidic and alkaline situations, and even in somewhat turbid waters. However, most any type of pollution will cause the bass to seek clean waters and will prevent reproduction and fry development. Excessive turbidity, caused by poor land management practices on the watershed, will soon destroy much of the bass population by smothering the eggs. Another factor which limits the abundance of this fine game fish is the exces-

Currituck guide Bud Lupton (left) and angler Dick Hatch have come up with a good bunch of bass from one of North Carolina's most famous largemouth spots, Currituck Sound.

PHOTO BY JOEL ARRINGTON, DEPT. OF CONSERVATION AND DEVELOPMENT

sive water-level fluctuations of hydro-electric reservoirs. Often times large quantities of eggs which were deposited in water two to four feet deep are killed by being exposed to the air.

The largemouth bass is not at all particular about his home. It may be a one-acre farm pond or a thirty thousand-acre lake, as long as the water is pure, the food supply adequate, and the spawning situation tolerable. The habitat requirements of the largemouth differ rather markedly from those of the smallmouth, although the two are found together in some of the mountain lakes in western North Carolina. The smallmouth prefers colder water and requires gravel or coarse sand for spawning purposes. This, of course, limits the range of the smallmouth quite drastically, but the largemouth can stand warm water and will spawn on any bottom except soft silt or muck.

Life History

Perhaps more has been written about the life history of the largemouth bass than of any other fresh-water fish. This may be partially due to the fact that its habits are relatively easily observed, but more probably due to the tremendous angling popularity of the species. The nest building of the largemouth bass is done by the male. It usually is in water from two and one-half to five feet deep. The nest is a circular, shallow, saucer-like depression from 20 to 30 inches in diameter, and is constructed on most any type of bottom—so long as the bottom is hard and not soft mud. This spawning-bed construction usually starts when the water reaches 60 degrees. The actual egg laying begins after the water has reached about 67 degrees and has remained at this temperature for two or three days. The eggs are deposited near the center of the nest, and hatch in a week or ten days if the water temperature stays between 65 and 70 degrees. Should the water temperature drop during the spawning period, all egg laying will cease and the eggs already spawned usually are killed. However, should the water temperature rise and stay moderately warm, the hatching period will be shorter.

Although smallmouth bass fry disperse rapidly within 48 hours after hatching, the young of the largemouth stay in compact schools for several weeks. They are carefully guarded by the male bass during that period. The schools of tiny bass fry can be seen moving close to the shore of most ponds and lakes during late May and early June.

Until the young bass fry reach approximately two inches in length, they feed almost entirely on microscopic plants and animals and immature aquatic insects. Very soon, however, the diet changes to the tiny fry of minnows and sunfishes which were spawned a few weeks later. Under ideal conditions, a largemouth bass will attain nine inches in length by the late fall of its first growing season, and sometimes spawns the following spring. However, the growth of a bass, as with all fishes, is directly dependent on the water temperature and the available food supply. The adult bass is a fairly efficient predator, and will eat almost anything that it can catch and swallow. Primary items in the bass' diet include minnows, sunfish fingerlings, gizzard shad, aquatic and land insects, frogs, and even its own young. The average age of largemouth bass probably is less than five years and rarely exceeds ten years.

Importance

The eating qualities of bass are directly dependent upon the way in which the fish are dressed and the way the meat is cooked. The strong or "weedy" taste, that occasionally is frowned upon by anglers, is almost always eliminated by skinning the bass and either filleting the fish or disposing of the belly meat and the layer of skin that lines the belly cavity. Practically no bones remain when the bass is filleted. This certainly enhances the eating qualities. Slow pan frying is preferable to either broiling or baking, although any of these methods is acceptable when properly done.

The largemouth bass is not a commercial fish in any state. Its sale is strictly prohibited in North Carolina, as is true with all game fish. It is a high quality sport fish, and probably provides more angling pleasure for more people than any other game fish in our waters. Practically any known method of angling will take bass on occasion; and, conversely, there are times when no fishing method will attract them. The wide variety of diet items make it practical to fish with almost any known artificial lure from the smallest artificial fly to the largest bait-casting plug. Spinning tackle for bass is popular, but bait-casting tackle is accounting for more and more bass each year. Popping bugs and streamers, and even small wet flies, are effective throughout the summer and make the fly rod a most practical weapon for bass. Even the stout cane pole and minnows take nice bass. The secret of mid-summer success with bass is to fish deep.

Bass fishing cannot be set down in any group of rules or sure-fire procedures, and this fact makes it the fascinating sport that it is. A complete knowledge of the habits of the largemouth bass, detailed information on the water that you are fishing, and infinite patience, all are requirements for successful bass angling for anyone from the novice to the expert.

How does North Carolina rate in national bass fishing statistics? The May, 1971, issue of Sports Afield lists the top fish in every state, and in the largemouth bass category, a 14 pound 7 ounce fish put North Carolina ahead of *all* states—even Florida. This should indicate to the most doubting skeptic that largemouth bass fishing in the Tarheel State is just about tops in the country. In order to keep it that way, the largemouth bass will require sound management and additional study, plus cooperation from the fishermen and industry. The observance of reasonable regulations, and clean waters as a place to live, are absolutely essential. ⬍⬍

My First Tarheel Bear—With A Bow

Jerry Rushing operates an archery shop in Monroe, N. C., and knows his business. Here he tells how he put it into practice.

by Jerry Rushing
Monroe

IT was three o'clock on a seven-degree January morning when I slid from under the covers of my disarranged bed and stilled the clanging of the alarm clock. Placing my feet on the cold floor I looked out to see what the night was like. The moon was shining bright and cast eerie shadows on the grounds around the house as it reflected off the frost and frozen ground. I shivered and climbed into my hunting clothes and started gathering my gear. Bill, one of my hunting companions, had called the day before to inform us of the sighting of fresh bear signs in a corn field near Mt. Mitchell. He was scheduling a hunting party for this morning and had issued an invitation to Don Baucom and me to join them. Of course, being true sportsmen and wanting to bag a bear with the bow we were eager to accept. Hopefully with a little luck we could catch old Bruin in the corn field about day break.

I sat lacing my boots when I heard Don's pickup pull into the yard. As usual he was right on time.

Both Don and I had bow hunted quite a while, but neither of us had been fortunate enough to get an arrow in a bear. I had killed big horn sheep, goats, barbary sheep, wild boar by the numbers and the limit of deer for several years, but no bear. As I laid my Bear Magnum bow and eight razor-sharp broadheads in the back of the truck, I had great hopes for today.

The three hour drive would give both of us plenty of time to discuss the hunt. As we drove along we relived our old hunts. We had pretty well discussed the day in front of us when we finally arrived at Bill's place.

There were about 20 hunters already there. Bill met us with a grin and introduced us to the rest of the group. They were all natives of the North Carolina mountains and all were hunting with guns. Don and I were the only bow hunters there and to my surprise none of them had ever seen a bow hunter. We really got the once-over as we took our bows out of the truck. We had a tasty breakfast of country ham and eggs and then answered questions for about 30 minutes on these "new weapons." They just couldn't imagine a man hunting bear with these primitive things. They really wanted to see our bows in action.

While we were loading about 25 or 30 hounds in the four-wheel drive truck, one of the other hunters asked me if I thought that thing would kill a bear. I assured him it would. He said he sure hoped so because he didn't want a crippled bear to kill and mangle his dogs. We all loaded up in jeeps and trucks

A clear shot like this (left) is seldom enjoyed by the bow hunter who must be as close as possible to make every shot count. And Jerry did just that. Don Baucom and the author (right) admire the bear pelt in the photo below. But Jerry wanted his prize in a life-like pose . . . and got it! (right).

and headed for the corn field.

The boys would take the dogs to the corn field and turn them out while the rest of us would go in above near the top of the mountain. We drove down narrow winding roads and forded several crystal clear creeks, brimming with trout, before we started the climb up the steep, one-lane logging road that led to the top. The hillside was covered with dense ivy thickets. We decided this was the most likely place old Bruin would cross, but how on earth would an archer get a shot through these thickets? We couldn't change nature so we would just have to take it like it was. We finally reached a more suitable spot and decided to try out luck from here.

By now the boys were ready to turn the hounds loose down near the corn field. They released a couple of strike dogs and immediately they hit old Bruin's trail. From up on the mountain I could hear the chase right from the start. They came up the mountain and then back across the hill the other way. Finally their barks grew faint as they crossed the ridge and went out of hearing distance. It must have been 45 minutes before I heard them coming back.

The music from them grew louder and louder, echoing off the hills, as they came my way, I could feel a lump rising in my throat and my mouth was dry as cotton. They hit the valley and came straight for my stand. I was in a laurel thicket so thick 15 yards would be my longest shot. The only thing I could hope for was to get in a trail so old Bruin would run straight over me.

Then I heard him coming. I could hear the shaking of the ivy and I believe he grunted every time he hit the ground. My heart was pounding like a bass drum. He came up within 40 yards of me and made a sharp turn to the right. My first thought was that he had heard my heart beating! It sure was banging away.

I finally calmed down some and decided he must have winded me. At that time the wind was blowing his way, coming from my back. Whatever the case, he had crossed the hill and made his way up the next one. I stood there and listened as the race finally faded out of hearing distance again.

I decided to move over onto the next ridge. After picking my way I finally reached the top of the rocky slope and decided to make myself comfortable. By now it was two o'clock and food was the furtherest thing from my mind. I sat down on a fallen log and wondered if I would ever get that shot at a bear.

At last, yes, they were bringing him back across a distant ridge. Slowly they worked their way across the ridge in front of me and all of a sudden they stopped. They had bayed. I grabbed my bow and took off down the mountain. I eased my way up the ivy covered slope to the hounds. With an arrow nocked, I moved up until I could see the dogs. To my surprise they were not bayed but had treed.

About 30 feet up a tall spruce pine sat old Bruin clinging to the tree and snapping his teeth. This was indeed a beautiful sight. I was happier than a six-year old kid on Christmas morning. I pulled my bow back and let fly. The arrow struck old Bruin right behind the left shoulder and came out the right side, missing the heart about one inch, but cutting the main artery.

In seconds, 350 pounds of black bear came tumbling out of the tree and hit the ground like a ton of brick. He was dead when he hit the ground. I think every dog in the woods piled on him at one time. They pulled and tore at him until they were completely satisfied he was not going anywhere. I had my trophy and a beautiful one at that.

I just sat back and waited on the rest of the fellows to get there. With a few yells and whistles they soon arrived. The old mountain boys were really amused. Said one of them "I just wouldn't have believed it. That arrow went clean through that bear—and my carbine won't even do *that.*" Exclaimed another, "Man that thing sure has the power. I just don't see how it does it." They all shook my hand and told me how happy they were because I had gotten my bear. They said they would be looking for us the next year on opening day.

While we were lugging the bear out of the hills to the truck one of them asked me if I was going to make a rug out of it. I told him I was going to mount it life-size and stand it in my Archery Shop for my customers to see and to remind me of this day in our beautiful North Carolina mountains.

We skinned the bear out and split up the meat. Don and I took our share of it and my trophy hide, waved good-bye, and headed for home in Monroe, N. C. to do a little boasting about the big bear. As we drove out of the rose-colored mountains, the sun setting behind us, both of us were weary but happy hunters. We realized we had completed one of our greatest dreams and a dream shared by gun and bow hunter alike, the success of having taken a bear with the bow. ◆

PHOTO BY JOEL ARRINGTON, COURTESY DEPT. OF CONSERVATION AND DEVELOPMENT

Waterfowl Sportsmen— A Guide Looks Back

by Robert W. Hester
Wilson

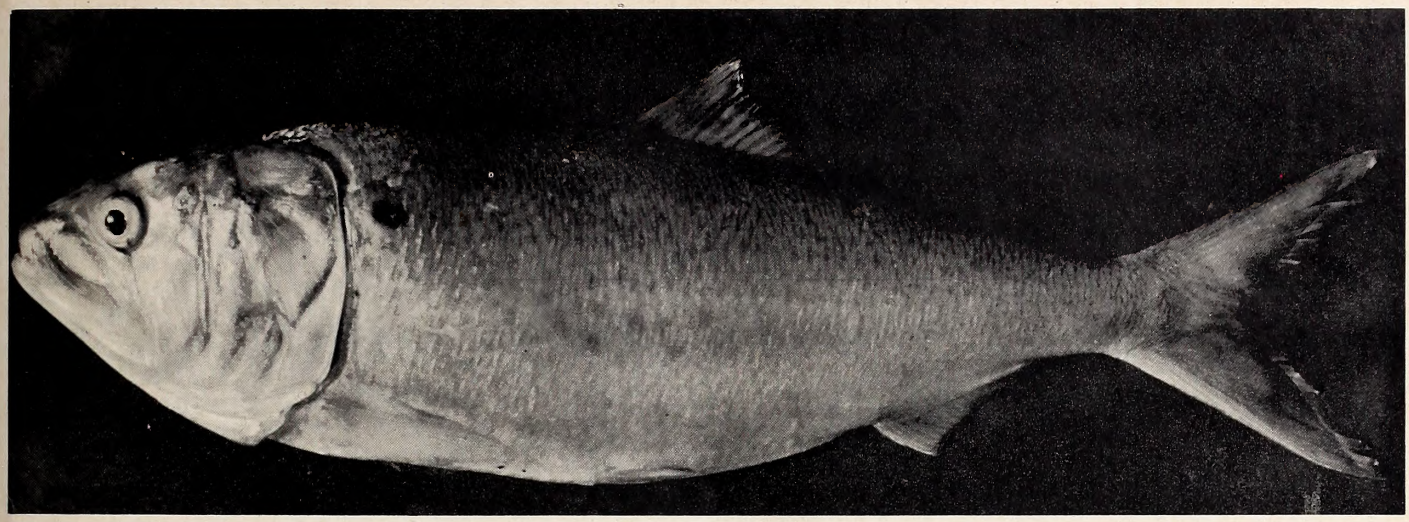
• The geese were following the large gander as the flock maneuvered out of range for several turns and then boldly came to us, broad wings whistling, barking calls, wide black feet extended. I spoke calmly to the hunters reminding them to pick out one bird, take their time, and squeeze their triggers. The honkers came; through my blind's bushes I saw them cross my range stake at 35 yards, the hunters breathed heavily, the flock began throwing their agile wings back to touch down in my staring decoys . . . "All right, boys, shoot them," I hoarsely whispered and the tense silence vibrated in explosions. The geese wheeled out and up, except two grayish blurs which limply crashed into the water. My retriever and I pulled in the two dead Canada geese as the jubilant hunters realized the deep thrill of being successful hunters.

As a guide on Mattamuskeet National Wildlife Refuge this past season I was fortunate enough to observe, on most hunting days, the true satisfaction waterfowl hunters received after such moments as described above. Although I derive much pleasure from remembering the successful days, I often think of the days which were unsuccessful in the kill record column. I relive days when 75 degrees was an unhappy temperature, and when the warm southwest winds were only ranked higher than no winds at all. When such weather conditions prevail the sportsman is soon sifted from the large ranks of hunters.

Today pick up any outdoor magazine and from cover to cover one can thrill to success story after success story of hunters and fishermen. One might find such exaggerated titles as "Honker Haven," "Mallards By The Millions," "Cottontail Country," "Quail Corners," or "Bass By The Bushel." But we realize as we read that only a very small percentage of our hunting and fishing expeditions end to deserve such glamorous titles. As a guide, who like most guides, want hunters to have success smiles and enthusiastic descriptions of the waterfowl they killed, I more so than anyone thrilled and rejuvenated with days when the cans or pintails gave us good shooting. But on one particular day when 75 degrees came, when we yearned for a southwest wind, when the decoys transmitted boredom, I had the pleasure of having as my party two Chapel Hill dentists who were truly sportsmen.

Bill Davis and Bob Williams had grown up hunting and fishing, and I would assume without fear of reproachment, had been unsuccessful before in their outdoor experiences. After hearing the weather forecast the previous night I realized I would have to decoy every duck that stretched his wings to reach the three duck per man limit. Therefore my decoy setup was executed as cautiously and precisely as possible. I tried all types of high-balling and chuckling to the occasional mallard or widgeon that would be seen on the wing in the distance, but when we cranked up the five and a half horsepower outboard and started in I found myself apologizing to my Chapel Hill hunters.

They insisted they had thoroughly enjoyed the hunt and with handshakes and smiles left Hyde County. They were well on their way to Orange County when in retrospection I recalled their frequent inquiries into species population and identification, their comments on the natural beauty of Mattamuskeet and their keen interest in how they could better know nature and how they could help her. Then like the morning sun erases the night's confusion I knew that these men had enjoyed a successful hunt, and that my apologetic endeavors were out of order. More importantly, however, I gained an insight on why conservation movements are gaining strength, why kill reports are not indicative of successful hunts, and finally why, with luck, we will have many days in the future when Carolinians can enjoy the thrill of coastal sunrises with waterfowl. ▲▼



PHOTOS COURTESY U.S. NATIONAL MARINE FISHERIES SERVICE

Menhaden: A Little-Known Resource

by
Jonathan H. Whitehurst
Dept. of Geography, University of North Carolina

EVER heard of menhaden? Well, does the name "fatback," or "pogy," bring anything to mind? Actually, all three terms refer to small herring-like fish which occur in great numbers along both the Atlantic and Gulf coasts of North America. Even though menhaden, genus *Brevoortia,* support the largest commercial fishery in United States waters, most people are not aware of the fish or the industry based on them. This ambiguity is surprising since for nearly a quarter of the century the annual catches of menhaden have exceeded the yearly poundages recorded by each of the other commercial species.

Perhaps this lack of familiarity stems from the fact that menhaden are taken for industrial purposes, rather than as food or game fish. Still, consumer products made from these relatively unknown species are used every day by people throughout the country. In recent years this vast resource has been exploited from New York to Texas, with a large concentration of processing plants located in the Beaufort-Morehead City area of North Carolina.

North Carolina's Resource

Menhaden constitute one of North Carolina's most important natural resources. In catch tonnage and dockside value, no other species comes close to menhaden. During 1968, for example, fatbacks outranked all finfish with approximately 82 percent (167.2 million pounds) of the total yield and 42 percent (1.9 million dollars) of the total value. Tarheel waters are inhabited by two different species of this fish: Atlantic menhaden *(B. tyrannus)* and yellowfin menhaden *(B. smithi).* However the yellowfin variety, common only in the warmer waters of Florida, is seldom encountered in North Carolina at this time.

Although some Altantic thread herring *(Opisthonema oglinum,* a species similiar to menhaden) are currently utilized by the state fishery, the great majority of each year's catch is composed of Atlantic menhaden. These fish are small, with individuals normally running less than 12 inches in length and under a pound in weight. Adults have slightly humped backs, large heads, and no teeth (gill rakers in the mouth and throat filter plankton from the sea water). Varying from dark blue along the upper portions to silver on the lower sides, Atlantic menhaden generally have a distinct black spot located directly behind the head on either side; older fish may have smaller spots scattered about the same area. Fatbacks tend to be very oily and bony, characteristics which limit their desirability as food fish, but enhance their worth for industry.

In conjunction with the annual migrations of Atlantic menhaden along the east coast of the United States, large schools of the fish usually

Much of the menhaden fishing is done with a purse seine in open water. A large school of fish, often spotted by aircraft, is surrounded with the curtain-like net and the bottom of the seine is "pursed" together as shown here.

appear throughout North Carolina waters during two separate periods each year. Beginning in May, sometimes in late April, a "spring run" of menhaden moves into coastal waters from the south and remains there until early September. A "fall run," consisting of three main advances from the north, begins about the middle of October and continues to the end of December or early January.

Although variations in arrival times and numbers of fish add an element of uncertainty to the menhaden fishery, this periodic mirgration has been and is still today the major factor governing the menhaden industry in the Tarheel State.

Early Development

Menhaden have been recorded in Tarheel waters since the colonial period. As early as 1709 John Lawson listed fatbacks as one of the salt water fish of North Carolina. In his general description of the species, Lawson wrote, "Fat-Backs are small fish, like Mullets, but the fattest ever known. They put nothing into the Pan, to fry these. They are excellent sweet food."

Even though menhaden were known to inhabit local waters since the early eighteenth century (and were undoubtedly eaten by some of the native people), impetus for the establishment of a commercial fishery did not come until the middle of the nineteenth century. During the Civil War years many soldiers of the Union forces, while stationed on the Tarheel coast, noticed the apparently plentiful supply of menhaden which frequented the sounds and estuaries and later gave exuberant accounts of the availability of the fish in that area. On hearing such encouraging reports, northern capitalists traveled south, substantiated the stories, and eventually invested in fisheries for menhaden.

Beginning in 1865, a variety of fishing operations were set up at several different locales, including the sound locations of Roanoke and Harper's (Harker's) Island; outer banks' areas near Roanoke Sound, Oregon Inlet, and Portsmouth Island; and a mainland site near the mouth of the Cape Fear River. However, in spite of the fish supply, the expertise of Yankee fishermen, and the capital of the promoters, all of these operations failed with severe financial losses in some cases. Writing in 1887 Goode and Clark reported the status of the fishery up to that time and commented on the possibility of a successful menhaden industry in North Carolina:

> Several efforts have been made to locate factories on the North Carolina coast, and some parties have prosecuted the business with varying success for several years. Thus far, however, no one has succeeded in making it profitable. It is, therefore, an open question whether this fishery can be prosecuted in the State.

It was not until the late 1880's that the menhaden industry was successfully managed in North Carolina. Although the fishery was probably in operation a few years earlier, full scale business was definitely in progress at Beaufort during the season of 1889. By the turn of the century it had

been expanded to an area near Cape Fear in Brunswick County. In 1907, just two decades after Goode and Clark had expressed doubts concerning a successful fishery in North Carolina, Hugh M. Smith briefly described the importance of menhaden and the well-established industry based on them:

> The menhaden is one of the most valuable of the North Carolina fishes. Here as elsewhere it is caught chiefy for conversion into oil and guano, at factories located in the vicinity of Beaufort and Cape Fear. Fishing is done with purse seines and haul seines in the ocean and sounds, and the industry gives employment to many people.

Since that time the menhaden fishery has been concentrated in the same two areas and has remained active with catches recorded for most seasons.

Modern Industry

Because menhaden characteristically travel through the near-surface water in compact schools, an encircling type of net, known as a purse seine, is used to capture the fish during their north-south migrations. Purse-seining, by far the most successful method of taking menhaden, accounts for approximately 99 percent of the annual catch in North Carolina. The actual fishing operation is conducted from two small purse boats (about 32 feet long), that are transported to the fishing grounds aboard a large carrier vessel (ranging up to 200 feet in length) especially designed for this purpose.

On reaching a school of menhaden, highly skilled fishermen lay the seine completely around the school of fish, somewhat like a curtain, and "purse" or close the bottom of the net, virtually entrapping the entire mass. The seine is first reeled in (compressing the school in a relatively small bundle next to the boats), and then the fish are pumped into the carrier vessel's huge central hold. Following each day's fishing, the catches are usually delivered to processing plants, known locally as menhaden factories. Since the fish begin to spoil within a few hours after being taken from the water, only those vessels equipped with refrigerated holds are able to remain on the fishing grounds for more than a day and keep their catches in satisfactory condition for processing.

During the spring fishery, lasting from May to September, seine operations are concentrated in Core and Bogue Sounds, in the ocean between Cape Hatteras and Ocracoke, and in the waters around Capes Lookout and Fear. In the fall primary fishing areas range from Cape Hatteras to Cape Lookout, with the waters around Drum and Ocracoke Inlets being of specific importance. Fishing also is done between Beaufort and Cape Fear Inlets, with the waters directly off Beaufort and Cape Fear being areas of most intense activity. In addition to the purse seine catches, a small portion (1 percent) of the annual yield is taken with pound-nets, haul seines, and gill nets.

Over the 10-year period from 1957 through 1966 menhaden landings were recorded in nine North Carolina counties. During this time, Carteret County accounted for approximately 77 percent of the total catch, by far the single greatest amount for any of the counties reporting menhaden, while Brunswick recorded about 22 percent. The remaining 1 percent was distributed among seven counties: from north to south—Chowan, Washington, Tyrell, Dare, Pamlico, Onslow, and New Hanover.

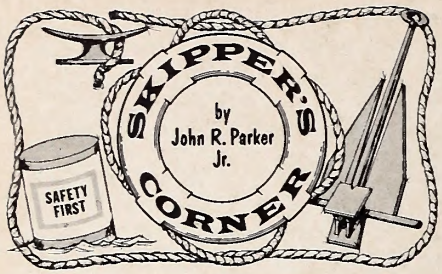
The heavy concentration of landings in Carteret and Brunswick counties reflects the location of large menhaden factories at Beaufort, Morehead City, and Southport. In addition to the three large plants located at Beaufort, two small operations (one making cat food and the other producing a high protein syrup called condensed solubles) may also be found in the area. With the inclusion of two plants near Morehead City, Carteret County has a total of seven businesses actively engaged in menhaden processing. Southport (Brunswick County) is the site of one other large factory.

These processing plants constitute the primary markets for the daily purse seine catches. When a carrier vessel returns to the factory, the catch is conveyed to a storage bin, an area from which the fish are soon moved into steam cookers. Following cooking, which breaks down the oil cells in the flesh, the whole mass is emptied into hydraulic presses where the body liquids are squeezed out. These body liquids are then run through centrifuges, a process that separates out the oil. The remaining liquid is usually evaporated to a 50 percent solids syrup (condensed solubles). The fleshy body parts and bones are dried in large rotary kilns, and then ground into fish meal.

At the present time, these industrial products—fish meal, condensed solubles, and oil—find uses in a great varety of consumer goods, both in the United States and abroad. Due to their rich protein and mineral content, meal and solubles are regularly mixed in certain animal feeds, particularly those connected with poultry and swine production. Menhaden oil is used in the manufacture of a vast array of consumer products ranging from cosmetics to varnishes. This oil is also exported to other countries where it serves as an important ingredient in margarine.

Summary

In the final analysis, menhaden *(B. tyrannus)* comprise one of North Carolina's most valuable fish resources. These migratory fish have been reported in Tarheel waters since the colonial period and have supported a fishery since the late 1880's. Each year, duing spring and fall, millions of menhaden are captured with purse seines throughout the coastal area and processed into industrial products at factories located in Carteret and Brunswick counties. The large annual catches make this enterprise the leading commercial fishery in North Carolina, both in quantity and value. ⬍⬍



SMALL craft operators by necessity need to use more precaution when venturing onto open water than do the fellows with the offshore cruisers, or true sports-fisherman. Factors such as weather, water conditions, fuel capacity and personal comfort need closer consideration, the smaller the boat. In a manner of speaking, the margin for error is less in the smaller craft.

The buddy system is a practical and fun-filled approach to open water boating (or any cruise). Most skippers like some company anyway and when the gathering is a result of careful planning, more fun is had by all. Each boat is, very simply, safety insurance for each of the other boats in the fleet.

On a coastal fishing trip not too many weeks back, yours truly took part in such a trip. Two boats were trailered from the Capital City while a third headed out from a coastal town, all to rendezvous at a popular Harker's Island marina. Portable radios in each of the cars from the Capital made the three and one-half hour trip seem just a little shorter. The back and forth chatter included such questions as "My rig feels like it's fish-tailing at this speed, is it?" "Did you hear that last weather report on the car radio?" "Are you ready to stop for a break?" These same portable radios were also used on the boats for fishing chatter so as to reduce our part of the traffic on our marine sets.

Upon arrival at the marina that evening, boats were fueled and tackle readied. And at sunrise the three boats headed out from the Island in trail and zig-zagged along the meandering, buoyed channel. Hopes were high as we crossed the bar of Cape Lookout's Barden Inlet.

Each of the three buddy boats was 19 feet long. But each was of basically different hull design: tri-hull, deep-vee and modified semi-vee. It was interesting to note how the different hull types reacted to the swells which later turned to a moderate chop as the eastern breeze freshened. Buoy WR6, the "trawler buoy," was our destination. It lies approximately five miles SSW off the inlet and as an old wreck site rates "good" at times for king mackerel. We trolled this area for awhile without luck then split up. One boat was usually always on the Cape shoal while another was offshore. We hoped one of our group would find the fish: blues, early Spanish or kings. About all we could report to each other through the morning was "No luck." The northeasterly breeze took care of that (if you believe in winds and fish appetites).

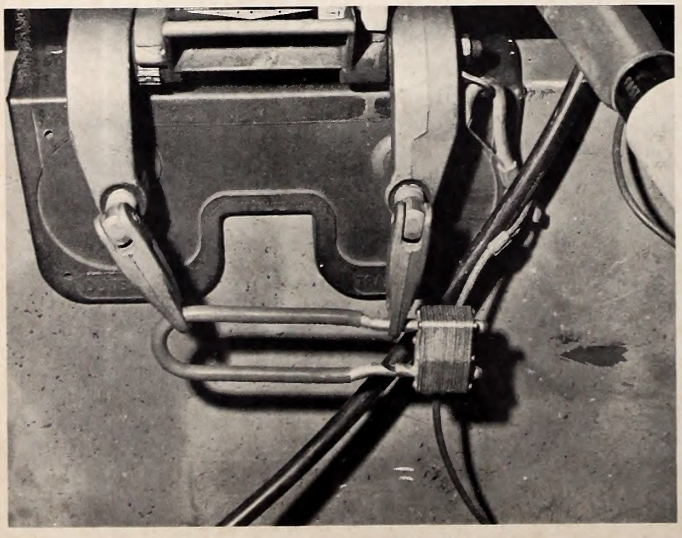
Whether you find the fishing on or off at your favorite area, I think you will enjoy the fun and safety of the buddy system trip. It makes for more fish tales, boat talk and the comfort of knowing if you need help a buddy will soon be alongside with a line and a grin.

Safety Tips From the Committee

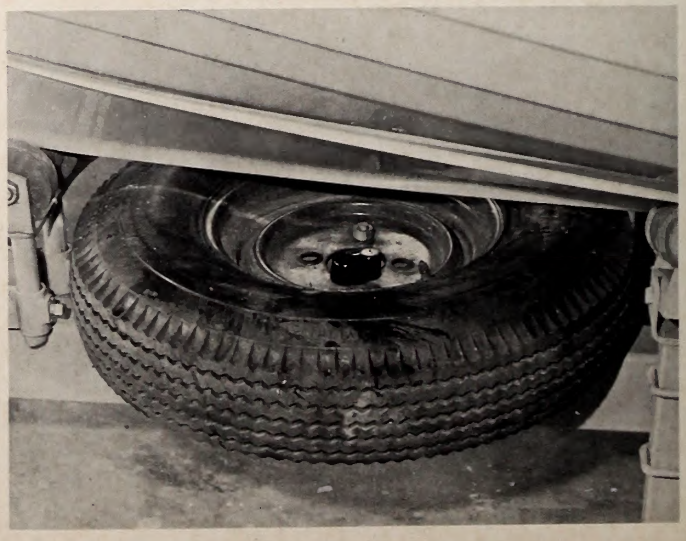
Each year the National Safe Boating Week Committee distributes literature kits to the various agencies and organizations that contribute to Safe Boating Week promotion. The Wildlife Resources Commission, of course, receives this material which includes many boating safety tips, program ideas, etc. Let us take this opportunity to extract some of those time-tested tips from "the kit" and offer them for your edification during this period in which we attempt to promote safer boating in

Some outboard manufacturers still provide bracket screws that will accept bicycle-type locks. Other makes (and of course larger motors) can be bolted to the transom to slow down the would-be motor thief. A good bike lock costs about $3.00.

PHOTOS BY JOHN R. PARKER, JR.



Maybe the spare wheel lock could be pried off, but perhaps not before some helpful bystander decided that the wheel didn't belong to the over-industrious one doing the prying. This type of lock is available at about $3.00.



SAFETY FIRST
boating's golden rule

OBSERVE THESE SAFETY RULES—

1 · Know your boat
2 · Don't overload
3 · Keep a good lookout
4 · Operate at safe speeds
5 · Respect the weather
6 · Take sufficient fuel
7 · Keep your boat in shape
8 · Carry necessary equipment
9 · Secure your boat properly
10 · Obey the law

- You are responsible for your wash and wake.
- Reckless operation is punishable by fine and imprisonment.
- Boats in your *"Danger Zone"* have right-of-way and should hold course and speed. Learn and exchange proper whistle signals to avoid misunderstanding.
- An overtaking boat is the burdened vessel.
- Sailboats have right-of-way except when overtaking. Pass them wide to leeward.
- Large vessels and tows are not quickly maneuverable. Keep clear—give them room.

DANGER ZONE

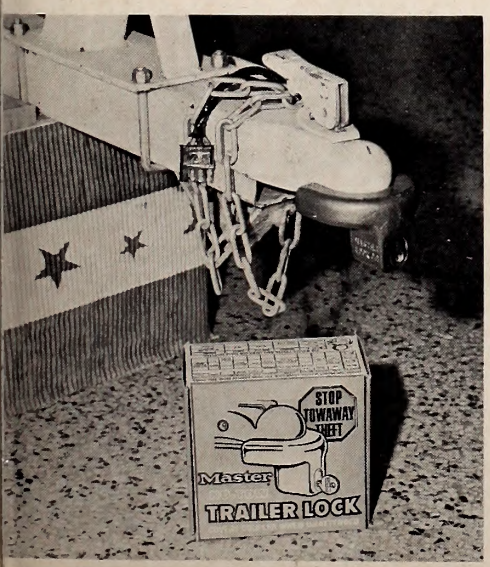
Be courteous and careful at all times!

NATIONAL SAFE BOATING WEEK
JULY 4 - 10

North Carolina and the Nation.

- Veteran seamen know the importance of keeping a "weather eye." The Committee for National Safe Boating Week, July 4-10, advises small boat skippers to check weather forecasts before setting out and to head for shore when foul weather threatens. Safe Boating Is No Accident.
- "Sit down, you're rockin' the boat," may be an old cliche, but it's also sound advice for small boat skippers.
- Smoking can indeed be hazardous to your health—especially when your boat is being fueled.
- File a "float plan" with a neighbor or relative, so that help can reach you in a hurry in case you need it. Safe Boating Is No Accident.
- Attention, small boat skippers! If you see a red flag with a diagonal white stripe bobbing in the water, don't move in for a closer look—give it a wide berth. It means there's a diver in the area.
- It's hard to beat water skiing for fun and excitement—but don't forget the other guy. Stay clear of swimming areas, fishermen, piers and scuba divers.
- Now hear this, small boat skippers! Don't run aground before you get near the water. Make sure your boat trailer is properly lubricated, tires inflated to the right level and your load well-balanced and secured.

There are several ways to secure your trailer to the hitch. This No-Tow lock in not quite as vulnerable to the hack saw as is a small lock through the hitch coupling. About $13.00.



Too many manufacturers use the "beauty on the bow" approach to boat sales. But high-speed bow riding is dangerous and is outlawed in some states. Keep the beauty inside, please.

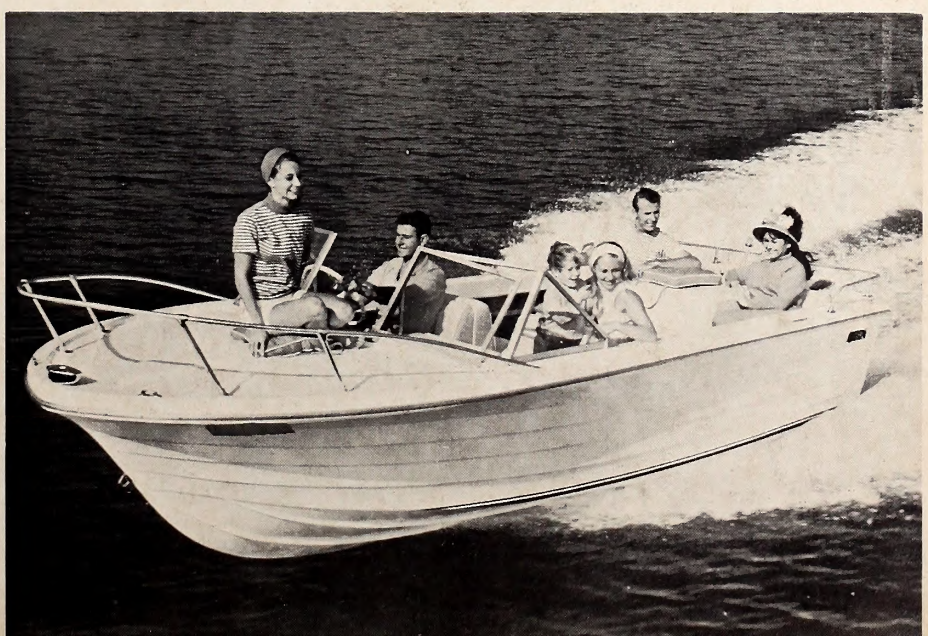
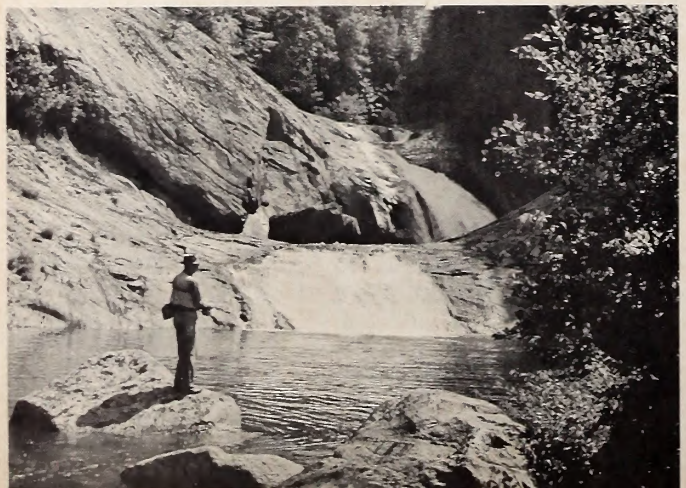


PHOTO BY TOM JACKSON

PHOTO BY LUTHER PARTIN

PHOTO BY JOEL ARRINGTON, COURTESY DEPT. OF CONSERVATION AND DEVELOPMENT



Something To Do

by R. Wharton Gaul, M.D.
Charlotte

SEVERAL years ago, *Wildlife in North Carolina* described the fishing available throughout the year in our state. As I recall, hunting and related sports got the short end of the stick. It seemed worthwhile to put the two together and devise some sort of calendar for sportsmen who live in or visit Tarheelia. Although the list is incomplete, and in a sense may never be complete, it is a remarkable commentary on the variety of wildlife and fishes found about us.

• January—a prime month for the hunter. Dove and quail seasons and even the season on the lightly hunted ruffed grouse are in full swing. Big game hunters may have a day or two remaining. Duck and goose hunters have a little time left, even though the goose is becoming a vanishing species in our state. Did you know in seasons past it was legally possible to take 24 waterfowl in one day? I doubt that anyone has ever done it, however. And of course there is the ubiquitous rabbit. Meanwhile, striped bass and winter trout can be found by those fishermen hardy enough to seek them out. For the freshwater fisherman, pickerel and huge largemouth bass can be had but with effort.

• February—still a good month for hunting. Quail, grouse, and as always, the rabbit remains available. Fishing is about the same as January, with the addition of a few crappie and some "hot hole" white bass, plus the now-and-then catfish.

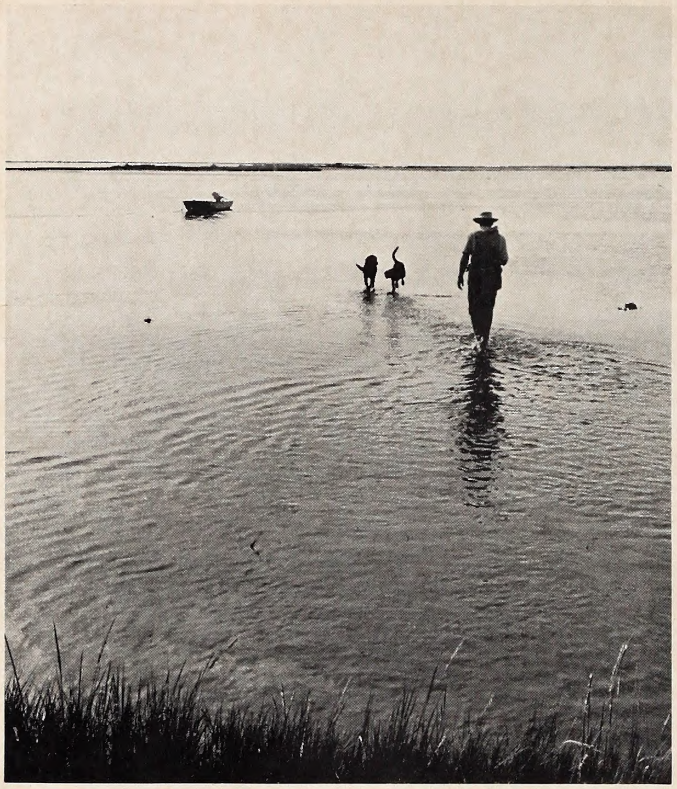
• March—for the hunting nut, there remains only the hunting preserve and a few crows who are smarter than he is, and maybe the ground hog. And fishing, while on the upswing, is far from excellent. Still, add a few perch, some early bream and the first of the shad runs, and who can complain? Meanwhile, back at the coast, the rare whiting, red drum, flounder and croaker may show, while far out at sea a few tuna begin to migrate by us. In the mountains, lake rainbows are fair game and one might find a smallmouth bass below the Designated Trout Water areas. Still, as Robert Ruark said, March is for remembering. . . .

• April—for the hunter, perhaps a spring gobbler season, or merely a few crows and woodchucks. He ought to be sharpening up his eye at a skeet range or repainting those decoys he blasted last winter. But actually, what *is* April? It is the trout season. What else? The water will probably be high and muddy, and only the bait fisherman will score, but we'll all be there lashing the water

with an assortment of flies and hardware sufficient to induce nervous prostration in even a hatchery trout. On to the mountains! Yet behind us is every variety of freshwater fish mentioned so far, plus walleyes and maybe a few others. And in the brine to the east, the species mentioned before plus a few spots, blues, sheepshead and mackerel are in close. Farther out, kings, albacore, snappers, bonita and black sea bass begin to bite. Winter is now only a memory.

- May—we dismiss the hunter with his turkey, crow and woodchuck. But the fishing! That fellow Walton didn't know what he was missing. To the salt-water list add cobia, dolphin, the marlins, amberjack, false albacore, bluefin tuna and even the lowly pompano, plus others I know not of. The Piedmont angler finds the bass and bream in the shallows and to the west, trout rise to mayfly hatches. Truly we live in Paradise.
- June—this is the month of May with whipped cream and a cherry added on top. Even the most dedicated hunter has oiled and stored his gun and taken to the waters. Fresh water species jump into your boat upon invitation. And in the salty areas, it becomes a task to attempt to list all the species. Add to the previous list hogfish, barracuda, porgies, wahoo and tarpon. Game fishing at sea really comes into its own this month. And don't forget Pamlico Sound's giant channel bass.
- July—really a deep sea month. Rising temperatures in the surf and in fresh water require a change of tactics. Fish either deep, or in the dark, or both. Trout streams warm up, so that Charles Cotton's "fine and far off" fishing becomes even more necessary.
- August—like July but more so. Sailfish are more common far at sea (it says here). A good month to rest for all but the big game fishing enthusiast.
- September—the spring or full moon tides flood the salt marshes and the ungainly marsh hen flaps awkwardly away from the gunner, who holds his fire, hoping for a stylish double next time. Farther inland, swooping doves bring joy to the manufacturers of shotgun shell, and indirectly to the Wildlife Commission (via the Pittman-Robertson Act). But who is the joker who raised limits on doves? I've hit even less since the new rule went into effect. A pox on it. And the fishing rolls on. Towards the end of the month, the shortening days begin to have their effect on shallow water, and both the surfman and his fresh water brother begin to heighten their pleasures. Every species of fish mentioned so far is available somewhere and somehow this month. And as if this weren't enough, even the hunting preserves are once again open.
- October—Ruark called it the golden month. Who could do better? Virtually every fresh and salt water species mentioned is available, although a deterioration in the weather later in the month can bring some deep water fishing to a screeching

PHOTOS BY JOEL ARRINGTON, COURTESY DEPT. OF CONSERVATION AND DEVELOPMENT



Above, a September rail hunter on Shackelford Banks heads back to the skiff after a morning in the marsh grass. At right, the pay off of a summer channel bass trip in Pamlico Sound. It was not until a few years ago that anybody really fished for these coppery brutes in the Sound.

halt. Meanwhile you say you're bored? Old buddy, why don't you head for the hills and chase one of them wild Russian boars? You won't soon forget it. Neither will your legs. And should you score, what could thrill your wife more than to have you march into her kitchen and toss a boar on the table? (Oh, you say you can think of several things? Oh well.) And for those less abitious, doves and marsh hens remain in style; while grouse, certain deer areas, squirrel season, and for those with a sense of humor, raccoon and opossum seasons are open.

• November — lives there the nimrod who doesn't agree with Havilah Babcock that our health is better in November? This month can mean two things to two diffenent people. To one of them, it is the bird season, meaning quail, and only quail, seen over a stanch point. To another person, it is the whistling wings of a duck as he inspects your decoy spread and decides to haul his freight to another county. But both would agree: Their health has improved tremendously of late. Rabbits, grouse, snipe, woodcock and even foxes invite us away from duller duties. Meanwhile the surfman is in his glory. Heavy channel bass are in the surf, and north of Hatteras he can hope for a trophy bluefish or striper. Trout, whiting, flounder and other lesser lights will amuse him meanwhile. Deep sea and fresh water fishing continue apace.

• December—as the year comes to a close, many forms of salt water fishing continue unabated. Admittedly it takes a more determined (or more bull-headed) angler as temperatures drop and the winds blow. But the really big drum have been caught in December, and one meeting with a school of trout in a slough will produce memories that will last a lifetime. Several deep water species, notably kings, tuna and amberjack have been caught in December, weather permitting, but little outside fishing is done this month. Meanwhile the hunter gets a crack at just about every game bird and animal on the list. This is the prime duck season, while his upland brother gets a chance with all the feathered fowl. Meanwhile the deer hunter is seldom seen at home. Using dogs in the east and rifles in the west, his work, marriage, and church affiliation suffer dreadfully. But a saddle of vension at Yuletide is not to be dismissed lightly.

And so the year ends. I mentioned earlier that the list might never be complete. New discoveries are made, old discoveries are revealed to the public, and patterns of wildlife as well as regulations change. Few knew, for example, about the summer fishery for heavy channel bass in Pamlico Sound until the last year or two, although a few people have fished for them quietly for years. What else don't we know? Interesting question. Places like the Pamlico Sound have a multitude of unrevealed secrets for the patient sportsman. New fisheries develop. Nobody caught striped bass along the Outer Banks ten years ago. Especially in midwinter. Add to these giant blues, with a hope for a January surf fishery and new sport is at our doorstep. More and more areas offer fresh water striper fishing. And on April 14, 1968, somebody caught a sturgeon from the Triple-S pier, using shrimp for bait. Can you beat it? It's a pretty good state to live in. ⬍

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

National Safe Boating Week

"Safe Boating is No Accident" is the appropriate theme of this year's National Safe Boating week, which runs from July 4 through July 10. Weather permitting, the holiday weekend will see more boats on the public waters of the state than ever before. The Wildlife Resources Commission's three patrol planes will team up with patrol boat teams on the water to keep a bird's-eye and fish-eye surveillance on boating activity on the busier waters.

Boat operators are reminded that water safety is a year-around responsibility, not just a week of special emphasis.

Panthers, Bobcats Now Under Legal Protection

The 1971 General Assembly passed legislation that places the American panther (*Felis cougar*) and the bobcat (*Lynx rufus rufus*) under legal protection. Panthers may not be taken at any time, but bobcats, taken from the list of unprotected animals, are classed as furbearing animals, and may be hunted from October 11-January 1 in and east of Caswell, Alamance, Chatham, Moore, and Richmond counties, and from October 11-November 20 and December 25-January 1 in and west of Rockingham, Guilford, Randolph, Montgomery and Anson counties. There is no bag limit on bobcats.

Rockfish Production Takes Nose Dive

Out of 25 million viable rockfish eggs at the Weldon Hatchery this year only 3 and 1/3 million fry were produced. Last year 23 million eggs yielded 13 million fry. The reason? The hatchery gets its water supply from a municipal water system. Chemicals added to the water to make it fit for human consumption were sufficiently concentrated to kill the fish.

Check Your License, PLEASE!

Is your boat registration certificate up to date? How about your fishing license? Certificates of motorboat registration are valid for a calendar year, January 1 through December 31. Last year's is no good. The same is true of fishing licenses. Your combination hunting-fishing license expires July 31.

PHOTO BY TOM ROLLINS

by T. H. Robbins
Wildlife Patrolman

IT was a fine day, and obviously a number of people were taking advantage of it.

The parking area next to the N. C. Wildlife Resources Commission's boating access ramp was full of cars and empty boat trailers.

The wildlife protector parked his car and got out. "A lot of people sure enjoy this area," he thought as he walked down toward the ramp. Suddenly he stopped and looked around, appalled. The ground around the ramp was covered with scraps of paper, broken bottles and empty beer cans. Over in the grass nearby he could see piles of trash. At his feet, someone had emptied a very full car ashtray. Even the parking lot was covered with litter.

The protector bent down and picked up several cans and dumped them into a nearby trash barrel. It was hopeless to think that one man would be able to clean up the mess. A crew would have to be sent out with a truck.

The protector shook his head slowly. Why, he thought, would anyone dump trash here? A community dump was only a quarter of a mile away, and the trash can placed at the site was scarcely being used. How much effort did it take to use it? Whatever effort it took, it was obvious that very few people had gone to the trouble. The natural beauty of the site was almost lost in the accumulation of trash. And the broken glass made it downright hazardous.

There was only one thing to do. It was not the most agreeable solution, but it was the only one left. The following evening, the protector and wildlife patrolman working in the area parked out of sight of the groups of boaters who were coming in and loading their rigs on the trailers.

A man in one of the boats threw a load of trash out of the bottom of the boat and left it on the ground near the ramp. The protectors moved out of the shadows and stopped the group.

"But officer," explained the man who had dumped the trash, "we were going to pick up the trash. You aren't going to give us a ticket for that, are you?"

"We have no choice," explained the protectors pointing out to a large sign nearby that warned of a $50 maximum fine for littering.

Soon, another boatload came in, and after loading their boat, they pulled away from the ramp. A window rolled down, and several beer cans clinked on the gravel.

Again the protectors appeared.

The offender groaned in disbelief as his citation was issued.

"Don't you fellows have anything better to do?" he asked. "Why can't you overlook it this time?"

"I'm sorry," said the protector politely but firmly, "but we cannot overlook it. You're right, we have plenty to do, and one of our duties is to see that these free public fishing and boating access areas are taken care of. If people like you were more considerate of others, we wouldn't have litter problems, and you wouldn't have a ticket."

"Littering not only makes these areas unsightly, but it also adds to the cost of maintaining them; littering costs time and money which could be used more beneficially for the boating and fishing public.

"You see, it's not just a matter of one or two beer cans. It's just that when a lot of people throw out trash, it can create a tremendous problem. You wouldn't throw trash out in your front yard, yet that's just about what you're doing because this access area and the many others across the state belong to you. How would you like to see your yard covered with litter? How would you like to cut a foot or tire on some of this broken glass? Your beer cans and trash may seem like a minor problem, but it all mounts up."

The problem at this access area can be multiplied sometimes to include the other access areas around the state, not including other public recreation areas.

Litter is a problem almost everywhere. Our highways are rimmed with millions of cans and candy wrappers. Parking lots are virtual seas of ashtray dumpings, napkins, bottles and cans. Almost everywhere man goes, he carries—and leaves—his unfortunate trademark.

In the remote headwaters of a sparkling mountain trout stream, you are likely to see the glimmer of a beer can in the bottom of a pool. Even the most isolated beaches are covered with litter left by inconsiderate visitors or washed on shore from boats where almost no one thinks twice of tossing trash over the side.

The problem is particularly acute in public recreation areas. Parks, national forests, camping areas, trails, and public boat ramps are favorite targets for litterbugs.

The Wildlife Commission's free boating access area ramps are not only among the most popular recreation areas in the state, but they also collect some of the biggest piles of litter.

The next time you use a public boat ramp, look around and see if the litterbugs have been at work. If they have, resolve not to join them. Take your litter home and put it in the trash can, or use the litter barrel at the access area. ◆

Environmental Quality—

WHAT IT MEANS TO ME

by Robert Michael Leonard
East Mecklenburg Senior High School

A great forest reaching from Cape Gaspe to Cape Florida, a great plain rolling from the Pecos to the Missouri, and a great and nameless land bounding the rivers, forests and mountains between God and Medocino are the things that met the fair-haired men who came with the rising sun. Mostly these things are no more; but occasionally if a man looks hard enough, he will find a glimmer of this once brilliant glory, and in finding and touching this glimmer, he will touch a natural beauty and environmental quality that none of man's buildings or statues can even begin to equal, let alone match.

When nature shows such beauty to me, I feel my skin moved by my soul, and I have what I call my own sensations of environmental quality. They are many; they are me. Some are the peace of moonlight on white wet clay and darkness in bottoms of kudzu dry and brown, the knowledge of having hiked through Licklog and Wallace Gaps, over Wayah, Burningtown and Copper Balds, to rest in a cabin stuck deep in a hollow of Wesser Bald, and listen to the voices of a Nantahala Creek, or the majesty of the soaring granite sweep of El Capitan, standing two Empire State Buildings above the waters of the Merced River.

The lonely beauty of lying in a cave high atop Table Rock and listening to the flow of wind and the distant roar of water while Humpback and Shortoff resound the thunder of the night, the sound of wind saying softly much more in the pines on Crowder's Mountain than the trucks growling on the interstate far away, and a breathless wait for the clouds to roll off Grand Teton and show the sharpness of its sky-rending peaks, are other sensations of that which environmental quality is to me. Still other different feelings are the excitement of rappeling down a granite face while a carabineer sings along a taut rope, the vague hope of lying with a girl silently in some farmer's woods—not talking, not touching, just watching the sky—the cold bite of a spring at Peck's Corner made colder by the black bear watching me bathe from his seat in the laurel.

But the stirring of the spirit of the mind comes warmly to rest high in Double Springs Gap shelter beneath Clingman's Dome while the rain pounds the tin roof and the mist-shrouded spruce trees praise the Grandfather of the Blue Ridge from Calloway's Peak; remembering my own grandfather dead eight years and my best friend dead one year, and being one with Whitewater Fall's thunder, being one with God.

Yet now in my lifetime, these sensations are in greater danger of destruction than they have ever been before and deep within me there are certain hopes for the life of my sensations and the earth's environment. One of these hopes is that conservational enlightment will come so that the highest trees will remain to address the greatest waters where the Klamath ends its long, downward trek from the Chanchelulla Mountain. I also wish that a love for clean water will make it so that men can once again jump into the East or Potomac Rivers without fear of catching used toilet paper on their ears. Calling in hope, I strain to see if more hate for the dirty air of our cities will cause the oil companies and the oil-eater car companies to change before we fall to the requiem of a million pistons.

In expectation of a new day, I ask that insects be controlled somehow so that babies can drink their mother's milk without getting more DDT than Government sees fit; and to urge for life, I hope for cities where nature's trees can stand among and beautify the glass and iron temples of man, showing that along with his brawn of steel, man has the wisdom of the peace of the leaves and the sky. Finally, I pray that, in seeing that nature's beauty is far greater than man's horrid magnificence, all men everywhere will forget their politics and wars which kill many and then turn this same force of destruction to bring to our bad times good days when the machines of deaths will come to plow our plains.

But for each hope, there is a fear, and now my fears outnumber my hopes. I fear that men will speak and not act and that the money lords will win out and destroy the forests, hills and rivers with their "necessary side effects of affluence." I loathe the thought that someday all this affluence might do us no good because all the water, all the sky, and all the good, will be gone. With dread I think of the possibility that DDT, aldrin, and dieldrin will remain for decades possibly deforming and warping all men to come.

I realize that with an anguished mind that men may not act fast enough in this situation which calls for immediate action or final death, and in horror I see that in 30 years there will be nearly seven billion people on this fragile sphere.

However, overcoming all hopes and all fears are thoughts of a third world teaming with starving humanity and by its own anarchy leading all other powers to the final war in which the greatest peacemaker of all times, the 20 megaton bomb, will have the last word.

Environmental quality is a thing to search for, to find. Were I told of some of my searchings and findings, but above all my trivial sensations and realizations, that environmental quality is the thing which made two of my friends destroy five dollars worth of "grass" in a fire when that grass's beauty suddenly seemed very weak and very futile beside the wind coming up through the rocks and trees of Crowder's Mountain from where the lights gleamed and the world moved in the far-off night below. ▲▼

SCARLET TANAGER

© RIEGEL PAPER CORP.

Our Tanagers

by Mrs. Grace S. Draper
Pleasant Garden, N. C.

A flash of brilliant red as a bird darts through the trees on a summer's day may mean that one of our familiar cardinals is passing by—*or* that one of our other "red birds" is visiting. For in the spring and summer we are fortunate to have in our state not only *many* nesting cardinals (that remain with us the year round), but also pairs of two of the loveliest migrants that could return to us from the tropics each year: the scarlet tanager and the summer tanager.

Any one of us who has seen a scarlet tanager has had a breath-taking and unforgettable glimpse of one of nature's loveliest creatures, bright red in color with jet black wings and tail. This is a shy bird, and generally frequents the treetops, where it finds its favorite food, insects and insect larvae; so it is seen only rarely. I shall not soon forget the excitement our boys experienced when they were dive-bombed by a handsome male down at the woodland creek on our farm a couple of summers ago—they must have been close to its nest. After watching him, spellbound, for several minutes, they came dashing to the house to take me to see him, too. And I arrived just in time to witness a rousing battle between this gorgeous bird and a little blue-grey gnatcatcher, also, I suppose, a trespasser in nesting territory.

In comparison, the male summer tanager is a completely red bird of a rosy-red shade. A more friendly bird, this tanager will nest in groves of trees near houses both in town and country. A pair has nested in our farmyard for the past two summers, once in an oak tree, the second time in a walnut tree. And that second time the nest was located on a branch directly above a wood thrush nest. We watched both sets of parent birds feed babies at the same time, and then take them off the nests on the same afternoon! The baby tanagers are such "ugly duckling" gnomes of grey—it is difficult to believe that they actually can grow up to be such beautiful birds.

Our tanagers are members of a large family of gayly-colored tropical birds (222 species); they were named by the Tupi Indians of the Amazon, who called them "tangaras". Only four species leave their tropical paradise to visit our country for the purpose of summer nesting, and we are fortunate to have two of these come into our area.

In mid-April, we may anticipate the arrival of the summer tanagers by listening for their cheery "pi-tuck-tuck-tuck" in the trees, usually heard long before we see them. We must learn to listen for the robin-like song of the elusive scarlet tanager, as he is often heard but so seldom seen.

The females of both species have similar plumage of a soft yellow-green color—not even a trace of red to relate them to their male consorts. However, each year before the annual migration to Central and South America, the male scarlet tanager trades in his scarlet plumage for the yellow-green color of the female, retaining the black wings and tail. He may sometimes be seen in molting plumage, a mottled red and olive green. Before returning here in the spring, he again changes his color, this time re-acquiring his handsome red feathers. Twice each year he thus changes his colors.

The diet of tanagers consists chiefly of leaf-eating insects (particularly caterpillars), berries, and small fruits such as mulberries and wild cherries. The summer tanager has been seen catching flying insects, like a flycatcher.

Both species prefer open oak and hickory woodlands for nesting areas, but in the north the scarlet tanager seems to be equally at home in pine and spruce forests. From a rather loosely-built nest, perched precariously on a high, forked, horizontal branch, both tanagers may raise three or four babies, their family for that year. If we listen for their calls, we will hear the "chip-chur" of the scarlet tanager and the "pi-tuck" of the summer tanager all summer long, until suddenly it is fall, and the absence of those calls signifies they have once again "gone South for the winter". ◆

SHARK!

by Mack McBryde
Division of Commercial and Sports Fisheries
Dept. of Conservation and Development

PHOTO BY JOEL ARRINGTON, COURTESY DEPT. OF CONSERVATION AND DEVELOPMENT

FISHERMEN in North Carolina as well as along the Atlantic and Pacific Coasts are discovering that shark fishing is one of the world's most fascinating sports. These marine predators give an angler a run for his money and put a super thrill into fishing.

Shark fishing is a rough, tough, and challenging sport which has been enjoyed by Australian, South African and British anglers for years. But North Carolina sportsmen belatedly realized that sharks are one of the world's greatest game fish. Shark fishing clubs have mushroomed in such places as Monterey Bay, California, and along the east coast from Miami to Montauk, Long Island.

In Florida and North Carolina, sharkers fish from piers and have caught fish weighing from a few pounds to several hundred. Most sharks taken from ocean piers and charter boats are caught accidentally while fishing for other game fish. in North Carolina we have a few die-hard shark specialists in the Piedmont area especially in Salisbury and Statesville. The sport has just begun to take hold in North Carolina.

Several years ago the Sandy Hook Marine Laboratory in New Jersey launched a shark research program. It received over 400 letters per season from prospective shark anglers.

"The Angler's Guide to Sharks," is published by the U. S. Government Printing Office and sells for 25 cents. To everyone's surprise, the pamphlet became a best seller overnight.

What is the attraction of shark fishing? Basically, it is the great challenge offered by the indisputable sovereign of the seas.

For the last ten million years, sharks have roamed the world's oceans. Little about them has changed perceptibly.

There are from 250 to 300 shark species. Through history they have been shrouded in mystery and myth so that man has only recently learned that the shark also can be a game fish of considerable stature.

Its fighting qualities prompted the International Game Fish Association (IGFA) to list six shark species on their honor roll of 48 game fish. A mako shark will repeatedly hurl its body from 10 to 15 feet in the air and spin to wrap the leader and line around itself. In one case a mako rocketed into the cockpit of a cabin cruiser.

But not all sharks posses the fighting ability of the mako and the great white shark. The hammerhead, blue, lemon, tiger, and dusky sharks all put up a good battle and challenge the angler although they lack the aggressiveness of makos and whites.

Sharks will eat just about anything, but the best bait is bonito, followed by menhaden, mullet, amberjack and rays.

The best way to fish for shark is from a boat. Baits are either dropped to the bottom or fished about 10 feet below the surface and held there with balloons attached to the leader. Chum bait is used to attract sharks, but if they are around, it will not be long before they find your bait.

If a shark is hooked and brought alongside the boat, it should not be taken aboard immediately. It can be drowned by dragging backward by the tail. Sharks die slowly and can be hazardous if brought on board while still alive.

Cleaned and dried shark jaws make an excellent trophy. Surprising as it may be to some, shark meat is equally as good as swordfish. In fact, many a housewife has bought shark steaks under a swordfish label.

This marauder of the deep is a gourmet's delight and an excellent game fish. It offers anglers a great sporting challenge. ◆

GIANT yellow bulldozers uprooted the land behind our house, tearing everything in their paths like wild animals on a rampage. No tree or twig was left standing; instead 50 brick apartment houses would grow, stacked like building blocks. I mourned the loss of "our" trees, ours because we enjoyed them; the broomstraw fields which served as homes for the wild rabbits whose red eyes met our car headlights often at night; the "Bob Whites" who paraded across our yard several times daily to the field. I wondered where the squirels, chipmunks and other wildlife would find homes in a fast growing, busy city. What I didn't know at that time was that one of them, a chipmunk, would find a home with us. And in the course of living with us, get our family involved in what we still laugh and call

The Case of the Disappearing Chipmunk

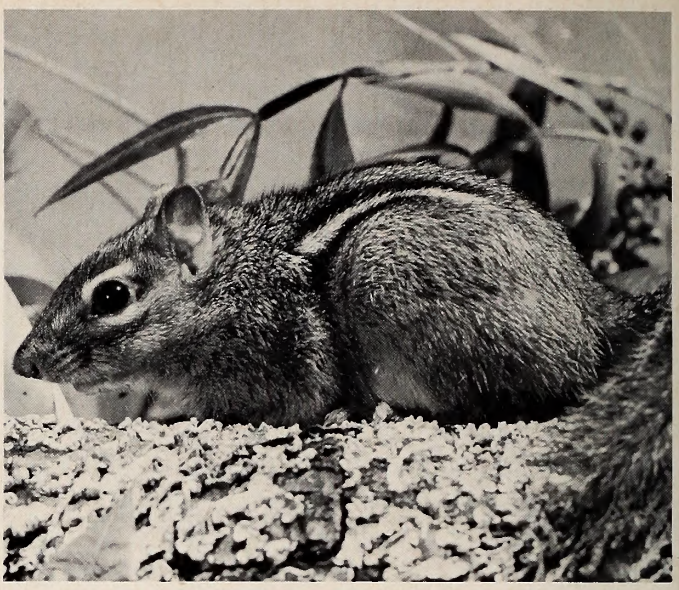
by Ruth Moose
Charlotte

I was washing the breakfast dishes to the roar of heavy equipment and watching red clouds of dust roll past my window when there was a sudden crash on the screen in front of me. Two tiny, bead-like, black eyes on a mouse-like creature stared at me. A very badly frightened chipmunk clung to the screen like it was his last hold on earth. And below him, all four feet solid on the ground, our dog, Sam, began to bark as though he'd treed a prowler of the worst sort.

For a moment I hesitated . . . surely a chipmunk could get away from a dog. But what if he didn't and I noticed this chipmunk was quite winded, his small chest moving frantically. I grabbed a large peanut butter jar I had just washed, and dashed out the door just as the chipmunk made several futile attempts to get away from the dog, only to run back to the screen, further weakened each time. I had to do it now, so I clamped the jar over him quickly, held the lid loosely and transfered him to the empty bird bird cage that had been empty since the last parakeet had flown the coop.

Once inside the house the chipmunk began to get his breath back, and away from the dogs anxious drools, he sipped water and adjusted to the confines of the cage quite good-naturedly.

When the children came home from school, the chipmunk drew a large audience of neighborhood spectators and admirers, in general. We called the Children's Nature Museum for diet instructions, and when wild strawberries were mentioned, the children organized a berry picking party in a patch the bulldozers hadn't reached yet. Watching Alvin, as we named him for the most colorful one of the three singing chipmunks, eat was better than



television any day. He would hold a strawberry daintily in his minute hands, nibble away to its green cap, then discard it with a quick toss and reach for another, packing his cheeks tighter than a quarter's worth of bubblegum.

Alvin turned out to be a true southern chipmunk with a real fondness for cornbread, preferring it to dry hamster food anyday. We cautioned the children and their friends not to put their fingers in the cage, but later Alvin did permit us to rub his back gently with the eraser end of a pencil. He slept curled in a kitten-like ball, his striped tail tucked around him like a coverlet. Awake, he sometimes gave shrill, chipmunk chirps, that for such a little fellow, we thought were astounding.

We talked of taking him to the park, away from the bulldozers forever, but each day we put it off. A week went by, then two, and Alvin became a member of the family, taken-for-granted pet, like the cat and dog, until one day he simply disappeared. He opened the door of his cage with those clever little "fingers" of his, and escaped somewhere in the house.

We had gone out of town for overnight and rather than ask a neighbor to "chipmunk sit," we filled his cup with water, gave him an extra generous portion of food and waved goodbye. It was only for one night, surely he would be all right. But in one night, a chipmunk can do many things, like open cage doors, and pick impossible to detect hiding places.

When we returned and saw the empty cage, its door swinging open in a lonesome way, we began to search the house. Scotland Yard could not have been more thorough; yet to no avail. As a last resort, we called in the dog, the original chipmunk chaser, held the cage to his nose, and said "Find!" He made a straight line for the refrigerator. The chipmunk was not on or under the refrigerator, nor behind, but still Sam held his point. We opened the door and Sam went straight to the left-over roast. No help at all can be expected from a dog who has a one track stomach.

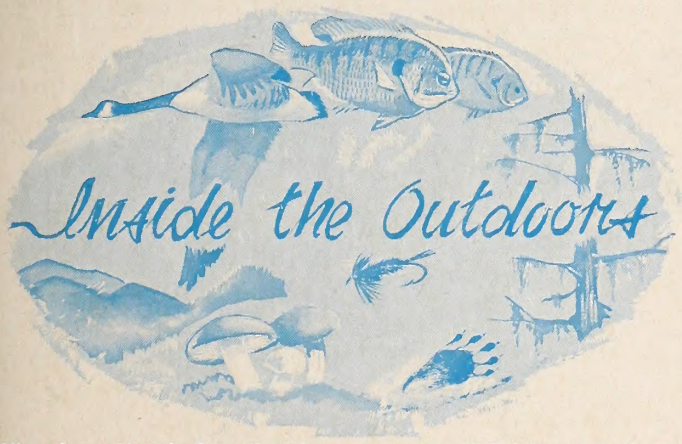
In bed that night we listened for the pitter, patter of little chipmunk feet and heard nothing. For three days and nights we heard and saw nothing. We looked and worried. He was starving, surely; he could be dead, dying. Where was he?

The fourth day one of the children was watching a favorite cartoon show on television when he heard funny noises from inside the sofa, then saw a fuzzy, brown ball flash across the room. "Alvin." He yelled and we all came running, chased, captured, and recaged the chipmunk, then breathed a sigh of relief. Alvin looked none the worse for his adventures inside the sofa. This time we were the ones who were winded.

The next day it was the park for real. Alvin and his cage were taken to a thickly wooded, hollow logged and many stumped area of the park. We opened the door of his cage, hid behind the trees and waited. He gave his cage a fond, farewell once over, stepped out the door, sniffed a few times, screeched, then listened, and screeched again. Finally he scampered off and quickly blended with the woods.

The empty cage rattled in the back of the station wagon all the way home as we talked about how Alvin's home would never be ruined by a bulldozer again, and how many friends he would have.

Now, whenever we go back to that spot in the park, we look for chipmunks . . . each one we see, we are sure it is Alvin. Last time we counted 12 . . . all Alvins.



Why does North Carolina have a law prohibiting hunting on Sunday?

It is impossible to give an exact answer, but this is probably a blue law which was passed for the preservation of the tranquility of country churches. Actually, military reservations in North Carolina may open their lands to Sunday hunting within the seasons established by the Wildlife Resources Commission.

Does the Wildlife Resources Commission stock private ponds with fish?

No. State fish hatcheries are supported by fishing license fees. Fishing licenses are required only when fishing public waters, and only public waters are stocked with fish from state hatcheries. The U. S. Fish and Wildlife Service processes applications for fish for private ponds.

Do fish spawn more than once during each spawning season?

Most species do not spawn more than once in any given year because it usually requires many months to develop a mature set of eggs. However, under unusually favorable water and food conditions, bluegills and a few other sunfish will lay two sets of eggs, once in early May and perhaps again in late August or even into the fall months. Bass rarely, if ever, do this.

Is the wild boar native to North Carolina?

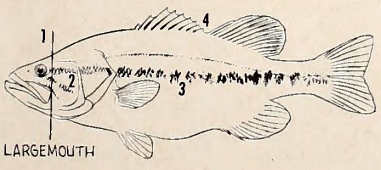
Not so far as we know. If the wild boar as we know it were around before the settling of our state, it certainly "died out" or disappeared before written history. Our present wild boar population apparently resulted from an original introduction of 13 European wild boar imported from eastern Europe about 1910-1912. These animals were supposed to stay in a fenced enclosure but broke out and escaped in the Hooper's Bald area of Graham County.

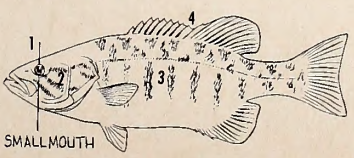
Why are hen turkeys protected during the open season but the females of the bobwhite quail and waterfowl are not?

For one thing, it is a matter of practicality: the male turkey or tom can be fairly easily recognized and distinguished from the hen. But the female quail is usually difficult to pick out when a covey gets up. Hen ducks are a little more readily distinguishable from the drakes, and some hunters make a practice of not shooting them. But it would be difficult to enforce this even if it was necessary for protection of the species.

I caught a 9 pound, 13 ounce bass from the Chowan River several weeks ago, and when I showed the photos I took of it to some friends, they said it was a smallmouth bass. What do you think?

We think it was a nice big largemouth bass. Sometimes a bass will grow faster than normal and have a chunky body and a relatively small head and thus a smaller mouth than others of its own species which didn't grow as rapidly. Also, smallmouth bass are usually found in western North Carolina, and are rarely caught east of Statesville. These sketches may help point out the features of the two fish.





The quail hunter growls at the rabbit hunter and his beagles. The trophy hunter growls at the meat hunter. The backpacker may growl at them all.

Millions of American outdoorsmen, with hundreds of varied interests that too often divide us and dilute our strength. Yet, all American outdoorsmen have common enemies. The same social, economic and political threats to bird hunting also threaten bird-watching.

One way to slow these enemies is to pour muscle, money and brains into effective organizations. For hunter and non-hunter alike, there's the National Wildlife Federation, The Izaak Walton League of America, The Sierra Club, the National Audubon Society, and The Wilderness Society. They're all regiments of the same army, and they badly need recruits during the next dozen months.

What can you do for the American outdoors? Take a lesson from the spoilers: study, learn, organize, make yourselves heard and felt, and put on some real political weight.

John Madson
Conservation Dept.
Winchester—Western Div.

Vulture Facts

Dear Sir:

In the April edition of WILDLIFE IN NORTH CAROLINA, there was a statement concerning the turkey buzzard or vulture that has really caught my eye. The statement was in the article entitled "Will Even The Vulture Vanish? and reads, "His beak is hooked but he does not use it to kill animals since he will not eat freshly killed flesh. I know for a fact that buzzards will kill and will eat fresh flesh. To prove my point, I would like to tell you an odd occurrence that happened on my father's farm last summer.

We are what you could call, hog producers, on a small scale. We try to keep up with the farrowing of our sows but sometimes, one will farrow a few days before expected. Such was the case last summer. A sow farrowed in the pasture. When feeding I noticed about a dozen buzzards swarming around her, I knew about what was happening, so I ran to her. Only to find that I was a little late. These vultures were having a feast. Out of the 12 pigs, four had already been picked. One was not dead, but his underside had literally been picked away. This was not the first time this has happened, so take my word, buzzards will kill and eat fresh flesh.

I also want to take this chance to say that I enjoy reading WILDLIFE IN NORTH CAROLINA, and really have learned a lot from it.

Dexter Denton
Centerville

Dear Sir:

Your magazine seems to be having more than its fair share of problems recently with regard to articles about birds. I'm afraid I must add to your woes by taking exception to another of your bird articles (N. J. Styron, Will Even the Vulture Vanish? vol 35(4):16, April, 1971). In this one, it is alleged that Turkey Vultures are "unable to detect carrion by smell but use visual clues only in locating it".

I refer you and the author instead to a study more recent than the one at Michigan State [Stager, K. E. 1964. The Role of Olfaction in Food Location by the Turkey Vulture (*Cathartes aura*), Los Angeles County Museum Contributions in Science. Number 81, 63 pages.] in which Dr. Stager of the L.A. County Museum has unquestionably demonstrated that Turkey Vultures do indeed use smell to locate and/or verify the location of food. This study is an example of carefully controlled behavioral experimentation, coupled with an examination of brain structure which cannot be easily dismissed. Considering the length of time that the "sight versus smell" controversy has raged over the Turkey Vulture, it can only be considered a compliment to Dr. Stager's work that no serious objection has ever been found with his conclusions.

I'm sorry we ornithologists seem so picky about accuracy. Maybe if there were more ichthyologists and herpetologists in the state we wouldn't appear so bad.

Best wishes,
Herbert T. Hendrickson
Asst. Professor of
Biology
U.N.C.G.

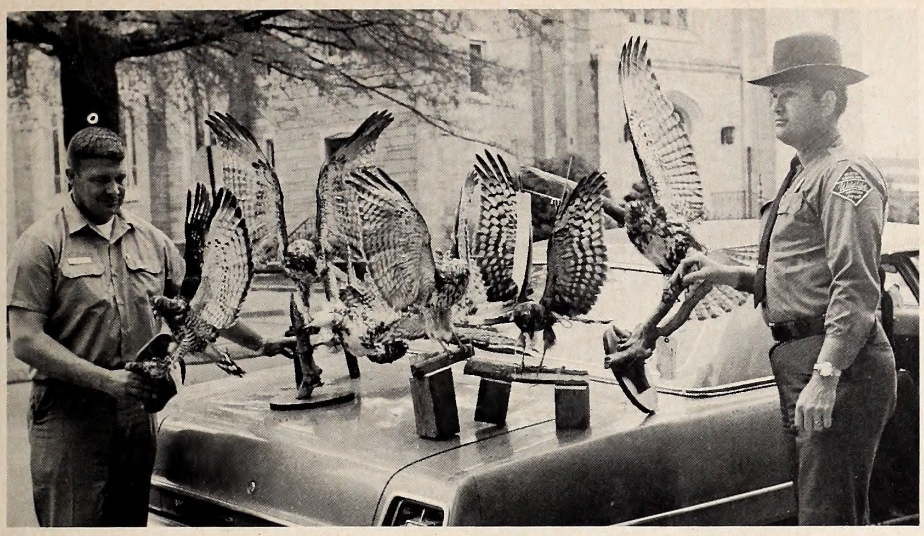
Help!

It may seem a bit strange to ask for Wildlife magazines back after you've bought and paid for them, but we are very short of the January, 1971 issue (the Biennial Report), and if you have any extra copies that you would part with, please send them to WILDLIFE, Box 2919, Raleigh, N. C. 27602. No reward for them, but we hope that you'll help.

Family Magazine

Dear Sir:

I have been reading WILDLIFE IN NORTH CAROLINA for a good many years. The issue of May 1971 was to me the best yet. It is a better balanced "Wildlife" magazine. It gives appropriate space and emphasis to facets of our state's natural resources. In the past there has been a tendency to give a disproportionate amount of space to



Underscoring a law which makes it illegal to take or attempt to take, or even possess or transport any hawk or owl in North Carolina, Wildlife Patrolman Kenneth Beam (right) and U. S. Game Management Agent John Menick confiscated the six hawks shown along with two more hawks, two owls, an osprey, and a piliated woodpecker. The taxidermist in whose possession these birds were found, was convicted of illegal possession of the above birds, and in addition, was fined in Federal court for possession of the piliated woodpecker. The individual owners of the other birds were also found guilty.

hunting and fishing.

Thank you for an excellent issue of WILDLIFE IN NORTH CAROLINA.

Respectfully,
Lin Hendred, Elkin

Glossy Ibis

Dear Sir:

I want to share with bird watchers what I have seen over Currituck Sound in the past two weeks, (May) Glossy Ibis, flying in formation, of seven to nine birds in a flock.

I have lived near Currituck Sound all my life, and I have neer seen these birds in this section.

We have also had a redhead woodpecker at our feeder this spring—rare in this area.

Ralph H. Wright
Jarvisburg

Wild Flowers

Dr. William S. Justice, co-author with C. Richie Bell of "Wild Flowers in North Carolina", calls to our attention that the statement made by Robert H. Morrison in his article "Guides to North Carolina Flowers and Trees" (May, 1971 WILDLIFE) that "The color photographs by Dr. Justice and others . . ." is misleading to the extent that actually ALL the photos in the book are by Dr. Justice. Dr. Justice has many excellent wild flower photos that have been widely published in other books also.

Marching Band

U. S. Fish and Wildlife Service
Washington, D. C.

Dear Sir:

We were hunting on Saturday, January 2, 1971, and we captured a raccoon and it had a tag on it and it said write to Washington Wildlife; we captured it between Pinewood, S. C. and Summerton, S. C. near Santee River. Weight about 10½ lbs.; the number on the tag is 746-12636. So looking to hear from you.

Joseph Pringle
Pinewood, S. C.

Dear Mr. Pringle:

I was glad to receive your letter of January 5, 1971, in which you reported the unusual recovery of one of our bands, number 746-12636. How it came to be attached to a raccoon, I have no idea. This band was originally placed on a ring-necked duck by the North Carolina Wildlife Commission. The duck was a male of unknown age at the time it was banded near Currituck, North Carolina, on March 4, 1968.

We sometimes get some very unusual recoveries of our bird bands—from fish, from food pellets found at the base of trees in which owls have roosted, in hawk nests, in polar bear scats—but we are always very interested when something like this turns up to lighten our day.

Brian Sharp, Biologist,
Bird Banding Laboratory

Contributions to rural safety have earned a state award for Paul S. Metters, Wildlife Patrolman stationed in Jacksonville.

The award to Metters was presented in Raleigh by the North Carolina Rural Safety Council. Three other individuals and six organizations received similar awards at the Council's annual meeting.

Metters was commended for the many hours that he has spent teaching water, boating and firearms safety to 4-H and FFA members, Boy Scouts and members of civic clubs.

He has also been active in beautification programs and programs to protect the environment.

The North Carolina Rural Safety Council is composed of over two dozen statewide organizations and many individuals with an interest in rural North Carolina.

★ ★ ★ ★ ★ ★ ★

KNOW YOUR PROTECTOR

Richard A. Stowe

Wildlife Protector Richard A. Stowe, stationed at Harmony in Iredell County, was born August 24, 1945. He is the son of Mr. and Mrs. Roy L. Stowe of Gastonia. Stowe graduated from Belmont High School, Belmont, N. C. He served three years in the U. S. Army, in Florida and Germany.

Stowe completed the Pre-Service Training School for wildlife protectors at the Institute of Government in Chapel Hill and was employed as a wildlife protector in Iredell County in July 1970. Since his initial employment, Stowe has completed four In-Service Training Schools.

FISHING ANYONE?

Long summer days with the sun still high in the skies allows people who work the usual 9 to 5, a chance to head for the creek for a little fishing before dark if you hurry. If things had followed a normal pattern that eventful afternoon, and we could have fished and returned home with a few exaggerated stories about our catch, then I wouldn't be sharing with you this very unusual fishing trip with "no fish . . or fishing involved."

It was a typical June day, late in the afternoon. . . my husband and I made all kinds of preparations (new fishing poles, nicely rigged, and a full can of wriggly, fat fishing worms) for this fishing trip. A friend of ours had described those bream so vividly and had made this particular place sound like the ultimate in fishing. We could hardly wait to get started.

We changed from office clothes to shorts, loaded the car as quickly as possible and drove down the busy highway until we reached the path where our fishing friend had instructed us to turn off. It was a narrow little path with grass and weeds growing alongside and a not too frequented look. When we reached the end of the road, we parked the car and walked at a fast pace through the woods that we assumed led straight to the river.

Our minds were all agog with the feeling that soon we'd return to the car and our gallon sized plastic bucket would be filled with those nice, fresh pan fish.

The first of our journey through the woods was quite nice. Beautiful old trees with low hanging limbs, moved slightly in the summer breeze, birds chirped happily as if to be singing about the cool shade and all this God given beauty. I decided that this was the perfect afternoon and at that moment wouldn't swap places with Princess Grace or Jackie (what's 'er name.) But this was only the beginning.

We crossed this first span of woods and entered a newly plowed field, it boasted of neatly furrowed rows of young green corn stalks that waved slightly in the summer breeze. We took off our shoes and dug our toes into the newly plowed soil, walked another half mile or so until we reached the second stretch of woods. Surely we would have planned this trip another day when we could have gotten an earlier start, had we known it would take this long. Maybe we were just over anxious to start fishing. We kept visualizing the dark water and those special looking little spots that only a fisherman knows about. Thoughts kept turning to the old fishing cork bobbing up and down and all these things churning in our minds hastened our step with not enough regard to direction.

Another mile through thick, dense woods and still no signs of the river and we began to slow down a bit . . . tempers were getting short and unkind phases such as stupid . . . and mumble jumble about directions started to pop up. The kind of anxiety that only a fisherman (who can't find the river) could appreciate. In a last frantic effort to save time, we left the little woods path and cut through thicker woods in a direction that surely would lead us to the river. To add further gloom to the situation it started to rain . . . not in dainty sprinkles, but fiercely with big, blustery drops. We hit some muddy sections and the red mud started to cake on our feet and we mired up to our knees at times. Sarcasm ceased and emotion turned to little hidden tears. Still no signs of the river . . . but who cares. Let's find our way back to the car and save those worms for another day. It wasn't that easy.

My husband was positive that his directions were correct . . . so we tried them for awhile . . . no luck. I was even more sure that he was stupid and that I was the smart one . . . still no luck. The rain started beating down more fiercely than ever and it was becoming almost impossible for us to make our way. The beauty of the woods had suddenly turned into an ugly web in which we had become entangled. Darkness began creeping in and occasionally we'd reach a slightly cleared place and the underbrush was not quite so high and it would turn a little lightness in. "Better hurry", he'd say, "make time while you can". My bare feet (that normally couldn't take the underbrush and briars) seemed immune to pain. At that moment I stepped on a terrapin that moved slightly and I screamed so loudly that I startled some kind of animal, and he literally fell from the tree right at our feet. It was almost as if our frantic

Mrs. Grace G. Byrd retired May 1 of this year, after 27 years of distinguished service as a secretary with the Wildlife Resources Commission, and prior to that, the Division of Inland Fisheries. Grace was presented with a certificate of recognition by Director Clyde P. Patton. Our best wishes to Mrs. Grace G. Byrd for continued health and happiness in the years to come.

plight had disturbed the entire universe, for the pouring rains continued to fall. We knew that total darkness would reach us soon and we continued our frantic pace to reach the clearing.

Many things crossed my mind. I remembered the rescue squad that I had never given much serious thought to before. I had a satisfied feeling of knowing that if we didn't find our way out, they would surely come to search for us. But . . . then I hated all that publicity that would go along when it was reported that we were lost. My husband kept trying to reassure me that everything would be fine. If we were forced to spend the night in the dismal place, we could surely manage. Dawn would come quickly and then we would find our way out. No more time to deliberate . . . keep trudging . . .

The rain seemed to be letting up a little, and almost as suddenly as a rainbow appears, light begin to shine through . . . the underbrush started thinning and we decided that at last we were reaching the clearing. We were wrong again . . . guess what we saw? *The river!* the same river that we had looked for so long. We suddenly realized that instead of heading for the clearing we had taken the opposite direction and must still cross those same paths to reach the car.

We paused for a moment or two to gaze at the beautiful sand bar on the river's edge. The calm waters seemed to stare back at us with a rather mocking expression. Our new fishing poles and those fat fishing worms were suddenly of no importance.

We turned and ran back down the same route, a little less desperate for we had gotten our bearing now that we had found the river. We hit the same rough spots, crossed more swamps, dug our feet into the same marshes, beat down bushes and crossed over and under huge logs until we finally reached the clearing. The timing was perfect . . . A few more minutes would have found us in total darkness.

The lump in my throat started to slowly disappear as we ran exhausted down those same rows of newly plowed earth. The aroma of fresh rain on young tender corn was prevalent. Our clothes were soaked and our hands and faces were smudgy with mud . . . Legs and feet were bleeding from scratches and insect bites. All were actual proof of our rather unusual experience. A fishing trip with no fish . . . or fishing involved! *Fishing Anyone?*

Mrs. Mable Talton,
Station Manager
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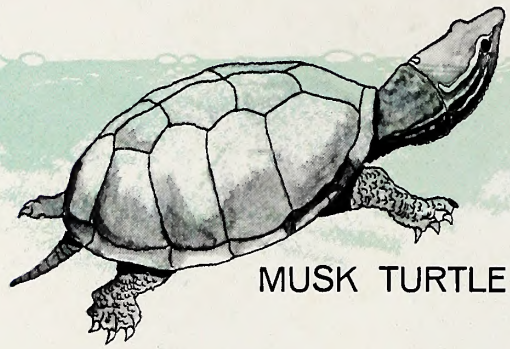
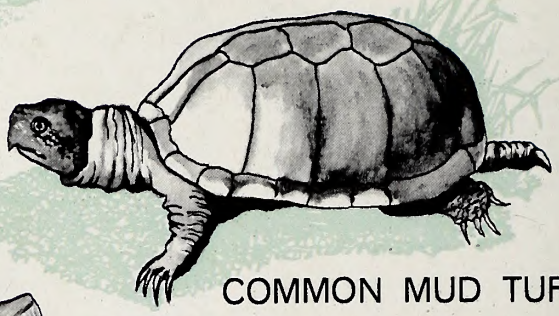
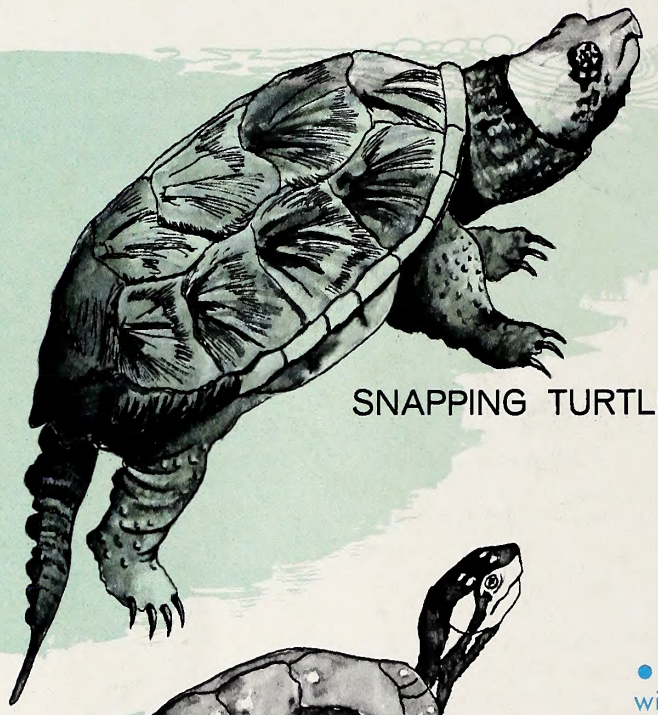


MUSK TURTLE

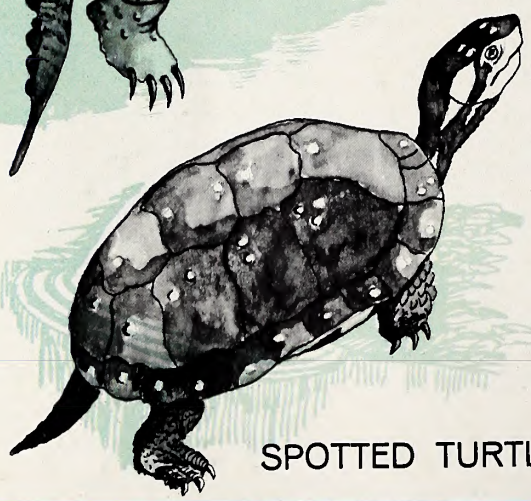


COMMON MUD TURTLE



SNAPPING TURTLE

PAINTED TURTLE



SPOTTED TURTLE

- Turtles are called scavengers because they will eat almost anything. Turtles have a horny bill or beak rather than teeth, enabling them to tear their food. Their diet generally consists of fish, worms, insects, larvae and plants.
- There are 45 species of turtles which fit into 7 different families. All these lay eggs, generally 6 to 12 in number, which are buried in the ground near water. North Carolina has many species of turtles and they are fascinating to watch. This summer why not take a few minutes to observe them as they observe you!

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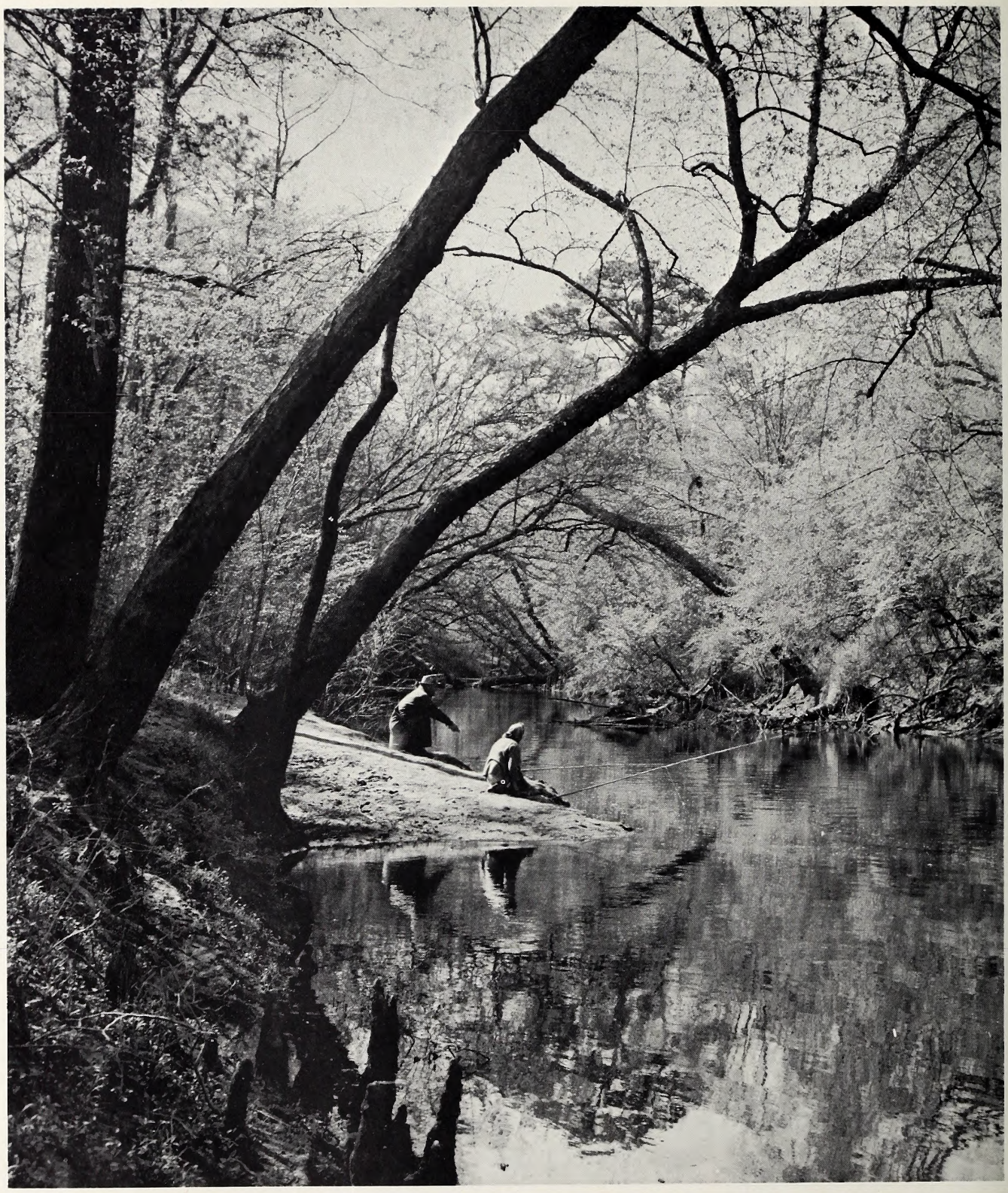

PHOTO BY JIM DEAN

Something Old

by Josephine M. Upchurch

It's time to go a'fishing
So get your bait and line
And meet me at the creek
Under the arrow-hewn pine.

Where trees are bent and old
And evening does not falter
To adorn the sky with gold
And mold shadows in the water.

We'll sit on the bank and wait
For a bass to come our way
And hope he'll swallow our bait
And we'll get a haul for the day.

But, if we don't get a bite,
Like wise oldtimers we'll swear
We lost a great day's catch
To a wily turtle's snare.

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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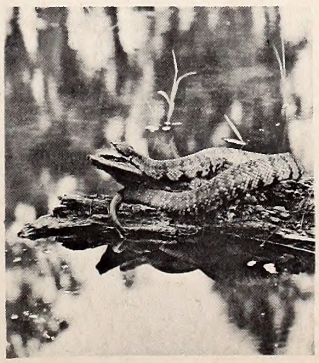
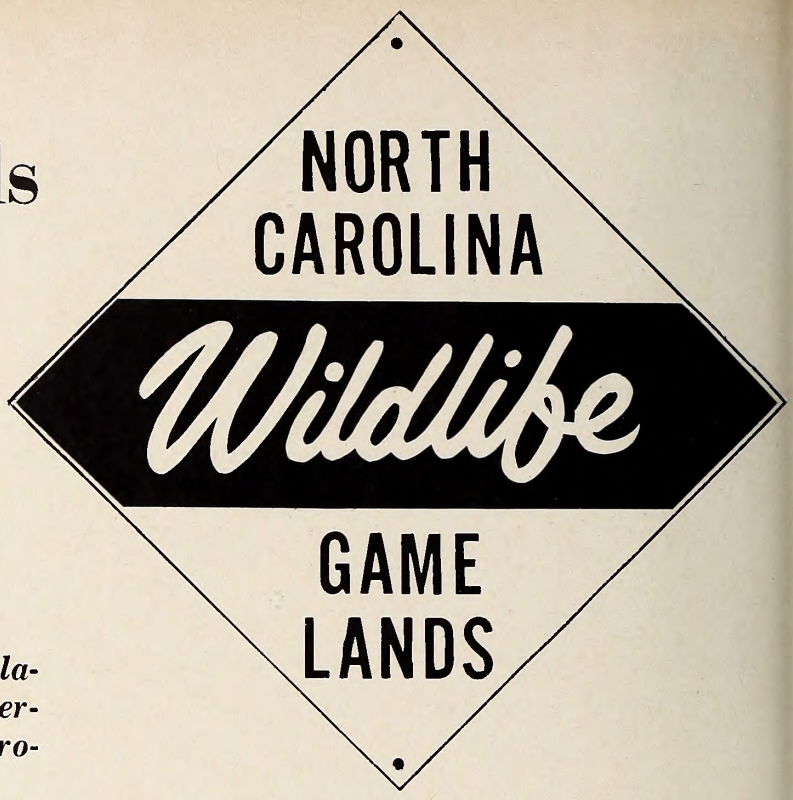


Perhaps we've asked the question before, but what do you see when you see a snake—even a poisonous snake like this highly colored cottonmouth? If it is total repulsion, deadly ugliness, we hope that you'll look again and try to see a citizen of the wild who has a place under the sun. No one would advocate making pets out of something, which by instinct, would harm you, but total destruction of anything diminishes the whole of creation. Photo by Jack Dermid.

What About The Game Lands Expansion?

by Jim Dean



How will it work? What are the new regulations? What's in it for the hunters, fishermen and other outdoorsmen in North Carolina?

WHEN a new program for hunters and fishermen in North Carolina is adopted, there are always a lot of questions.

That's to be expected. After all, when the North Carolina Wildlife Resources Commission voted on June 7, 1971, to adopt a new Game Lands program, it was probably the most significant action for hunters and fishermen the Commission has taken in recent years.

It involves an expansion of the Game Lands from about 700,000 acres to 1.5 million acres this year, changes in regulations, reductions in fees and many other facets which would affect hunters and fishermen in the state.

Despite news releases and public hearings, many outdoorsmen did not know exactly what was being proposed, or why. Some still don't.

Many thought that the Wildlife Commission planned to take over complete control of the four National Forests in the state. Some were concerned that many public and private lands that had previously been open to hunting and fishing might be closed.

Essentially, the Commission's action involves acquiring the right to manage wildlife and hunting and fishing on these new lands—an area about one million acres of U. S. Forest Service land, publicly owned state land and some private industrial forests.

"This is a program in which the Wildlife Commission enters a cooperative agreement with these landowners to improve hunting and fishing for the public," said Clyde P. Patton, Executive Director of the N. C. Wildlife Resources Commission. "We do not assume ownership of this land, nor do we acquire the right to manage anything except wildlife, hunting and fishing.

"Where no landowner-Commission cooperative agreement can be worked out, of course, the land will not become a part of the Game Lands program," added Patton.

Already, a cooperative agreement has been worked out with the U. S. Forest Service to add all of the four National Forests in the state to the Game Lands program. This means that land on Croatan, Uwharrie, Pisgah and Nantahala National Forests which is not already part of the Game Lands program will now be added effective with the 1971-1972 hunting season. The details concerning the addition of any public state-owned lands or private industrial forests are in the process of being worked out.

One of the most common questions outdoorsmen have asked concerns these national forests.

"I can already hunt on most of this land without paying any Game Lands fees" said one hunter at a public hearing. "Now that this land is a Game Lands and I have to pay a fee to hunt or fish on it, what extra benefits will I get for my money?"

This is certainly a fair question, and the main reason for expanding the Game Lands lies in its answer.

"Public hunting land—good public hunting land—is rapidly disappearing, particularly large tracts of near wilderness land," said Patton. "Some of it is being posted and some is being cleared for development. I don't believe the Wildlife Commission would be doing its job if it did not take steps now to insure that quality

PHOTO BY JACK DERMID

The Holly Shelter area is but one unit that will be incorporated into the new system of Game Lands covering some 1.5 million acres.

hunting land will be available for future generations. The expansion and intensification of wildlife management services on these new Game Lands will insure that good hunting and fishing areas for the public on large tracts of land will be provided for the future."

"Not only does this expansion provide for the future, it will also greatly improve the quality of hunting and fishing in this state now," said Patton. "The best public hunting in the state has been on those 700,000 acres of Game Lands we've been operating, and this good hunting will be expanded to take in the new lands.

Some outdoorsmen in the state have wondered how the Wildlife Commission plans to create better hunting on the new lands.

"In the past hunting on these new lands has not been generally up to par," said Patton.

"The reason is that this million acres which we are adding to the Game Lands program has never been under the same kind of intense wildlife management that our previous 700,000 acres of Game Lands have had. In other words, these new lands don't have as much game and fish as they are capable of producing. Our wildlife management program on Game Lands can remedy this problem just as it has on our older Game Lands where game and fish are now plentiful."

Wildlife management—as it has been practiced on old Game Lands and now also on the new Game Lands—includes many things. One of the most important parts of wildlife management is protection—or the use of Wildlife Protectors to insure that game and fish regulations are not broken. Such regulations are set to protect game and fish and insure that adequate breeding stocks are not depleted.

Wildlife management, particularly on this additional million acres of Game Lands, will also mean the mapping and marking of boundaries so that outdoorsmen can easily recognize the areas.

It will also mean many other things on these new Game Lands. Where appropriate and necessary, steps will be taken to improve the habitat for certain species of game and fish. There are many examples of this kind of work, including food patches, deer pastures, waterfowl impoundments, stream improvements, trees and cover planting, and others.

The new Game Lands also will receive increased study by biologists to learn about diseases, breeding habits, populations and and other things which affect wildlife and thus influence regulations.

"These are a few of the techniques we have used on Game Lands in the past, and they have been highly successful because game and fish populations are excellent on our older Game Lands," said Patton.

Regulations which will affect not only the new Game Lands, but also the older Game Lands, have been greatly simplified. Starting this fall with the 1971-1972 hunting season, hunters should be pleased to find that it no longer takes a doctorate in language to figure out what you can hunt, when you can hunt it, and how. And everyone will have equal opportunity to participate.

The Commission has established a Game Lands use permit which will cover all hunting and fishing for all species on all Game Lands throughout the entire season. The cost of the permit will be $6.

Hunting will be allowed on a six-day per week basis on all Game Lands except those which are primarily dove areas, small game hunting areas or waterfowl hunting areas. On these areas, hunting will remain at three days per week on Mondays, Wednesday and Saturdays.

"The idea is to promote hunting by seasons rather than through specially organized hunts for specific groups of hunters," said Patton. "In the past on our Game Lands, we've scheduled many exclusive hunts for certain species on certain days. We've had special deer, bear and raccoon hunts, for instance, and there are other examples.

"The calendar and land area available just don't permit the scheduling of so many special hunts, and the regulations are unnecessarily complicated as a result. We also feel that such hunts are unfair to the majority of hunters. We want our regulations to be fair to all hunters, and therefore, we are making changes which will promote hunting by season when all can participate together."

There are other changes in the regulations on Game Lands. Big game tags will be issued with Game Lands use permits, and all big game killed on Game Lands must be tagged. Wildlife Protectors and biologists will spot check and collect big game kill data on or near Game Lands. There will be no check stations in operation as in the past.

As in the past, deer hunting with dogs will not be allowed on certain Game Lands, generally in the western part of the state.

The new Game Lands program also allows the Wildlife Commission to take necessary steps to save the state's rapidly dwindling population of black bear. A total of 26 bear sanctuaries will be set up in prime bear habitat, and no hunting or killing of bears will be allowed on these sanctuaries. Where wild boar occur on these bear sanctuaries, those who hunt for them must do so without using dogs.

PHOTO BY JACK DERMID

Various management techniques, both game and forestry, will be employed on the Game Lands. Here, a "forest edge" has been created to enhance wildlife food plant growth.

"Although we have already begun the tasks of mapping and marking the boundaries on these new Game Lands, much work lies ahead, and it will be some time before these two jobs can be completed," said Patton.

"As the boundaries are marked, increased wildlife protection and intensified wildlife management will be undertaken. Protection will play a major role, and we are now in the process of expanding our Division of Protection by bringing many present "refuge" personnel into the Division of Protection. Many of these men will work full time on Game Lands protection. To fill the gap they leave, special mobile management crews are being organized to handle on all Game Lands the habitat management duties now performed only on limited areas by refuge personnel."

Fishing regulations for the 1972 season on the new Game Lands have not yet been adopted. Before they are adopted, of course, they will be aired at public hearings in October, 1971, across the state and detailed studies and plans for improvements are now underway.

Generally speaking, however, it is expected that the same $6 Game Lands use permit plus required state licenses will cover trout fishing privileges as well as hunting privileges.

"In other words, only one annual Game Lands use permit costing $6 plus the regular state licenses would be required when using Game Lands for hunting or trout fishing or both," said Patton. "All the many special former management area permits for hunting and fishing would be abolished."

For the hunters and fishermen who have used Game Lands in the past, this new single permit system will represent a considerable savings. For instance, a season fishing permit on western Game Lands in the past cost $15.50. In some cases, on the special daily hunts, the daily Game Lands permit was $4. These will no longer be in effect.

In speaking at the public hearings in regard to proposals for the 1971-1972 hunting regulations this past spring, Patton closed his remarks with several statements which seem to accurately reflect the sound thinking behind the expanded Game Lands program.

"We foresee this Game Lands program not just as an expansion of areas, but as a new, much broader approach to the growing problems of providing quality sport on an expanded, more equitable basis," said Patton. "We believe that this expansion is the only solution for maintaining and improving the sports of hunting and fishing now and in the future, and whether or not this program is successful depends largely upon you and the support you can give us." ⬍⬍

BASIC CATFISH

by Sarah Sheffield

CATFISH. Just saying the name moves you down south—live oaks draped with ground-brushing Spanish moss, winding sand roads following the banks of meandering rivers, and long, lazy evenings that are perfect for a fish fry. So pull out those frying pans and make friends with a truly southern treat—the basic fried catfish.

Say you don't live on the bayou? You shouldn't have to worry because many supermarkets now carry catfish, and of course you can catch your own! It is true that at one time the mustachioed old gentlemen did live only in sluggish streams, but recent research into the ancient practice of fish culture has led to two different methods of rearing catfish in ponds.

In the first method the young fish are stocked in a pond where they swim free and feed on specially compounded food. When they reach marketable size the pond is drained to recover the catfish.

An even newer method of raising catfish is being studied by the Cooperative Sport Fishery Unit at North Carolina State University. The catfish are growing in cages. If, for example, 500 young "cats" are placed in a cage a little larger than one cubic yard in March and are fed on their catfish chow, by the end of the growing season, about November, almost 500 grown-up catfish are ready for the table. The use of the cages eliminates the need to drain the pond or otherwise round up the fish. In cold weather the fish in the cages are not growing or active and eat little food; they are literally in cold storage just waiting to be used.

As a result of these two new techniques, catfish is now available to consumers more than ever before.

Why the surge of interest in farming fish? Pollution mainly. Restaurants can no longer depend wholly on supplies of wild fish from rivers, and as an alternative must grow their own or buy pond-raised fish.

Even though many years ago the catfish moved into the high cotton of Yankee restaurant fare, he has often been neglected by his fellow southerners. These recipes, designed to help the catfish make friends, come from the experts—Dr. and Mrs. Eugene Hester of Washington, D. C. and Dr. H. S. Swingle of Auburn University, a pioneer catfish culture researcher.

So the next time you're hungry for a good fish fry, try the basic fried catfish dinner.

Dr. Hester's Fried Catfish

Cleaned catfish
1 Box cracker crumbs
Eggs
Salt and pepper
Vegetable oil (Peanut or Corn)

Beat several eggs in a bowl large enough to accommodate a fish, and empty the cracker crumbs into a second bowl. Add salt and pepper. Dip the cleaned fish in the egg and roll in the cracker crumb-salt and pepper mixture.

Pour the vegetable oil into a frying pan. The oil should be deep enough so that the fish is almost covered. When the oil is hot, add the prepared catfish and fry until the outside is golden brown, then cook a few minutes longer.

If you have a whole catfish, clean just as you would any other fish, but also peel away the skin. The tails may be left on the fish; the real catfish connoisseur says that is the best part—when they are fried crisp they taste better than potato chips!

Mrs. Hester's Cole Slaw

Shred the following ingredients and mix them together in a large bowl. (The proportions depend on your taste and the amounts depend on how many you are serving. The amounts given here are just an example.)

2 cups raw cabbage
½ cup apple
¼ cup carrot
2 tablespoons onion

Dressing

½ cup sugar
½ cup vinegar
½ cup sweet (homogenized) milk
1 tablespoon salt
1 tablespoon prepared mustard
1 tablespoon butter
1 egg

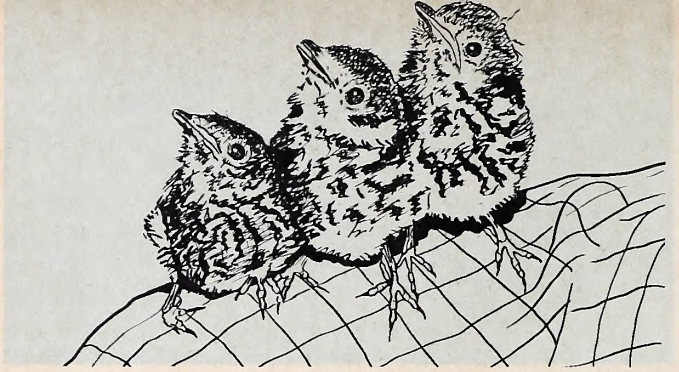
Mix and cook in the top of a double boiler until the dressing begins to thicken. Cool and pour as much as is needed over the slaw. The recipe is foolproof!

Dr. Swingle's Hush Puppies

(For 15 people)

5 cups corn meal
2 tablespoons corn starch
1 tablespoon baking powder
½ tablespoon salt and pepper
4 eggs
2 chopped onions
1 pound cheese
1 can evaporated milk
2½ cups water

Grate the onions and cheese. Combine the other ingredients and mix thoroughly; add the onions and cheese. Drop by large spoonfuls into hot vegetable oil and cook until they are golden brown.



SKETCH BY H. M. DRAPER

Eleven Days With The Bluebirds

by Grace S. Draper
Pleasant Garden

I awoke about 5 o'clock one August morning to see lightning flashing and hear thunder rumbling in the distance. Dawn was only beginning to appear beyond the sentinel of the trees surrounding our farmyard. This early and unusual setting foretold a storm in the making; we had had only slight rain for days.

And, the storm that began with only a murmur in the distance, developed into an ear-rending artillery of noise and fury as the elements vented their wrath upon us—thunder, lightning, wind, rain, and hail. Huge, gnarled limbs were twisted and torn from the giant old oaks in the yard, to come crashing to the ground amidst the uneven staccato barrage of hail against our windowpanes. Tornado-like gusts of wind violently heaved waves of rain against the house and onto the screened porch, knocking over favorite house plants and completely drenching the beds and bed linens just vacated by our sons whom we had hurriedly moved into the house just before the storm broke. Background for this performance consisted of a frightening and continuous display of the thunder and lightning fireworks! In an hour it was over, except for the echoing rumble of thunder in the distance again, leaving us with the routine business of clearing away broken branches and other debris that had been left behind.

Such brief, furious storms have poignant stories always, too, as I realized when I found, first, the innocent little wood pewee, a victim, beneath an oak tree harboring its nest. And, at almost dark that day, lying pathetically against the side of the house, I found a beautiful mature bluebird. My heart missed a beat, as I suddenly remembered our son, Tom, had mentioned that the baby bluebirds had been chirping a lot that morning, and he also recalled seeing two babies come to the box entrance, as though looking for someone or something, which was most unusual, now that the pattern pieces were beginning to fit together: both parent birds must have been killed in the storm, and the baby birds were crying for help! We also recalled that no one had seen the parent birds making their rounds back and forth in the yard all day, something we had become accustomed to seeing for several days. Action would have to be taken right away, as the babies probably had had nothing to eat all day!

My husband fetched the small ladder and climbed up to lift the box lid (as this post is about six feet up), and, sure enough, the babies were crying vainly for help—two so weak they could hardly open their mouths, two clinging to the front at the nest box opening, trying to find somebody or something. This was highly unusual, as well-fed babies usually nestle in a cluster in the center of the nest and do not open their beaks when the box lid is lifted—as if the mother bird has given them a signal to be quiet until she returns. It was as though it had been *meant* for us to find the little parent bird and *do* something about the babies! Before it was too late! With the past history of the decline over the years in our bluebird population, it is important that *every* baby hatched be given a chance to survive.

It *was* late—dusk was fast approaching now and there was no time to lose. A pale green lacewing climbing the bird box post at that particular moment became instant food for one hungry baby. I rushed out to the deep grass behind the barn to catch a few grasshoppers, which were eagerly devoured by the two stronger babies—we had to force open the closed beaks of the other two babies in order to persuade them to take food. (We believed they were about four days old.) And then, gathering up all four in his hand, my husband brought them to the house, where we could make a little warm nest in a small box for them, and feed them additional grasshoppers and a little water-soaked bread. There might be hope for them if they could survive the night.

We remembered two bluebird families located in fields on either side of the house—one mother had three babies in her nest, the other four. Were these babies close enough in size to put into a nest where they would be cared for by a parent bluebird? Would she accept a strange baby as her own? Had it been tried before? It was a decision that had to be made immediately, as darkness would be upon us in fifteen minutes, and the mother bird would have gone to bed with her brood. Unhesitatingly, one tiny baby was chosen and taken quickly to the nesting box of the bird with three babies, giving her a fourth. She could care for four almost as well as three, for bluebirds generally have four to five babies. We would keep the other babies overnight and check on this one several times the following day to see that it was being fed. It was just slightly larger than the three babies in the nest. (Subsequent daily checks on this box during the following days showed that this baby was ac-

cepted and taken off the nest with his family.)

We would also check for storm damage to the bluebird box having four babies. Much to our sorrow we did find a casualty in this box the next morning—a dead baby bird. Whether it had smothered to death, or died from some other cause, we did not know. We sadly buried the two storm victims, the parent bird and the baby bird (for the loss of any bluebird has become highly personal in our family), together with the adult pewee we had found beneath the old oak.

Even though it is best for wild babies to be cared for by their own kind, we had no choice here: after family consultations, it was decided it would not be wise to add one of our small orphans to the nest now containing three birds, as these were much larger in size, with well-developed wing feathers and small tails, and would soon be leaving the nest (they were probably about ten days old).

Out came the blue canton flannel scraps saved from babyhood of our sons, to wrap around our small orphans in the clean, dried grass nest placed in a basket, with a covering. August nights are warm, and the babies would be well-fed, dry, and warm. Those first few days our three babies were in the capable hands of Tom, almost 13 years old, who had had experience in caring for baby puppies and bantams. He was surely kept busy, too, with catching chiefly grasshoppers and crickets, gathering pokeberries, scraping apple, making a soft mixture of water and cornmeal, banana bits, chopped raisins, and serving up a little water-soaked bread, for good measure. The babies loved it all, and begged for more. At first they had to be fed something about every half hour, but as the day progressed, he could limit feeding to once an hour by the clock, and his charges seemed to awake and start begging at just the right intervals! After he fed them about 7:30 at night, they would sleep through the night, awaking with just chirping noises about 7:30 the next morning—very much like human babies.

We observed that when they slept or rested, the three assumed a quail-like arrangement in the make-shift nest, with heads out and tails inward. We have also noticed this in our nesting boxes when we would lift the box lids for nose-count purposes. However, babies in natural nests will make movement or sound when the lid is opened; our orphan babies loudly professed hunger with shattering shrieks when they and Tom decided it was feeding time! After feeding, they would settle down into a small circle, making sweet warbling noises amongst themselves (as you would expect songbirds to do), and gradually go to sleep. In just one day they learned that Tom's fingers furnished their food, and they would follow his hands with their eyes and open beaks. They also seemed to know his voice. By the third day, Tom could make a short whistle, and, as if on cue, the three little heads would pop up and a chorus of open mouths and noisy begging for their food would begin.

By the third day, too, we could tell we had one male and two female birds by the bright blue plumage steadily forming on the wings and tail of one bird, whereas the other two were still growing somber charcoal/dark blue feathers (the general over-all color of all three birds), with the characteristic grey-streaked breasts of immature bluebirds. We believed they were now one week old.

A daily diary was kept on the baby birds, with the following notations being recorded:

"4th day—Babies eating well and quite alert and bright. Seem to have grown more feathers.

"5th day—Tom named male 'Cricket'; one little female 'Screechy', as she is loudest and begs for food longest after others satisfied; the other small one 'Susie'.

"6th day—Cricket' wants to sit on edge of box now when being fed. His feet grasp edge fair. Twice he has climbed there by himself. Babies are developing personalities: 'Cricket' more aggressive, 'Screechy' more retiring, 'Susie' gets trampled upon.

"8th day—'Cricket' will now take grasshoppers from Tom's fingers, inside the cage to which we have moved the babies. 'Screechy' will almost do the same. 'Susie' seems smaller and slower in reactions than the other two birds. 'Cricket' hopped from his sleeping box, across picture window, to driftwood 'tree' at the other side this morning. He wants to fly up on things now.

"9th day—This morning 'Cricket' and his sisters seemed more active than usual. He flew across chairs, etc., in the family room and did not want to stay in the cage. We put the babies out on the screened porch, where they perched among the house plants—two on the angel wing begonia which had hanging branches for their feet to grasp. We made pictures in the house of the three sitting in various places and on Tom's shoulder."

Suddenly in the afternoon a mother bluebird appeared in the oak tree in the yard and began calling, in a clucking voice, to the birds—where had she come from? Did she have another brood, or was she just passing through? Had she lost her own babies or her own eggs through some accident? Was she an immature female, as such birds will sometimes help feed babies in successive broods?* In any event ,here might be our chance for adoption. We put "Cricket" out on the carport bench, and she immediately came to him and started feeding him, one trip after another. So we put the other two babies out for her, and she fed them all afternoon. The mother bird would seem to know which one she had just fed, and would go to the next one each time. They remained in approximately the same places, quietly—no noisy chattering such as we had had before!

*"If a parent bird, for some reason, cannot reach its own nestlings to feed them, it feeds almost any young bird."—"When something happens to the parents of a young bird, some other bird may assume the parental responsibilities in a way analogous to human adoption."—Dr. Harold E. Burtt, PSYCHOLOGY OF BIRDS, pages 64, 146. Macmillan Co., N. Y., 1967.

At late afternoon, "Cricket" was sitting on the flower trellis. The mother bird had attempted to entice him across the yard, away from the porch, clucking to him constantly. I went out on the porch and spoke to "Cricket". He turned and chirped to me, fluttering his wings. Then, just as suddenly, he again fluttered his tiny blue wings, and soared, unafraid, across the yard, as though he had been accustomed to performing such feats daily for days, alighting on the low-hanging branch of the old oak tree close to the house, yet on the edge of the yard, a distance of approximately 80 feet—his first *solo* flight! He had successfully made it—and the mother bird flew to him! He then moved up into the tree higher.

His baby sisters were left on the porch—they seemed not ready to risk flying and only attempted to fly up onto porch objects, not quite making a landing. The mother bird did not come back to them, so we brought them into the house for the night, intending to put them out again early the next morning. They seemed perfectly happy to have us feed them and tuck them in for the night.

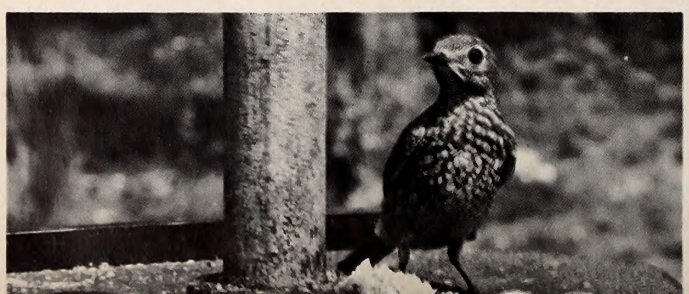
The next morning we put the two babies out on the carport bench early—but no bluebird came to feed them. So we brought them back indoors, and again put them on the side screened porch, feeding them all morning. They were quiet, and did not seem active or noisy as the day before—no noisy chatter, only begging when offered grasshopers, which they accepted eagerly.

After lunch, as if on cue again, the mother bird appeared, and attempted to enter the porch where the babies were sitting. We moved them outside, and the parent bird, although cautious of us, fed them, and managed to cajole them into following her across the yard, in the grass, to the honeysuckle vines beneath the oak. There they remained most of the afternoon. She continued to feed them. ("Cricket" was spotted once in the tree above them when he flew close to where his adoptive mother was sitting.)

Late in the afternoon, although we knew they could not fly to the limbs above them, we picked up the babies and placed them on a limb about six feet high in the oak, where they remained, and the mother came to them. We decided to leave them there this night, since it would be quite warm with no rain. They were originally sitting on separate branches, but when I went to check on them at dusk, they had moved close together on one branch, against a curved knot, and looked like a little round, grey bump on the limb. They looked at me with wide open eyes, and did not seem to be afraid at all. They seemed perfectly happy there!

This young bluebird made it this far through the maze of hazards that seem to be associated with the growing up of wild things. Man can often help by minimizing the dangers he creates in the wildlife world.

PHOTO BY JOEL ARRINGTON



The following morning early (11th day) the mother bird came to the babies on the branch (who had survived and looked quite perky) but in moving around they again fluttered to the ground, where the mother continued to come to them and feed them all morning. (They moved around quite a bit in the shrubbery and grass.) She would fly down to pick up an insect on the ground, then to a perch above the baby bird, quickly dart to it, feed it, and fly away again for another insect. It was interesting that she went from one baby to the other, seeming to remember which one had been fed last.

During the afternoon, when of necessity I had to be busy indoors with household chores and could not closely watch them, the adoptive parent bird managed to persuade the two small birds to follow her from their location in the yard, under the shrubbery, down through the honeysuckle at the edge of the yard, past the row of beehives, and into the small hedgerow of wild coralberry bushes and scrub pines, on the edge of the woods. There she warned us, if we approached, in no uncertain terms, as she made her clucking signal, that this was "off limits" for mere mortals! Several times that morning she had dive-bombed me when I went to check on the baby birds. With them on the ground so much, this would have been an especially critical time for the babies insofar as predators were concerned. However, we do not have any cats, and our farm dogs do not chase birds as we have birds and bird feeders around us year-round.

It was by now almost dark. The babies were close to the woodlands, and in relative safety now. That night we had another rainstorm, but not a severe one. The following morning we went out to look for the mother bird. She was there at the wood's edge, clucking, and we could hear at least one baby answer her with its melodic "chir-up". Was it blue "Cricket"? Or "Screechy"? Or little "Susie"? Perhaps we would never know, and perhaps it was not meant for us to know. Some things in Nature must remain secret, for her eyes alone.

But by carefully listening for, and watching for them, in the days that followed, we knew they were in our yard—their hunting and feeding territory.

Two weeks after release we saw them come to the ripe pokeberries at the edge of the yard—our babies had grown so they now seemed almost as large as the parent bird. Since then we have seen them daily in our yard—what a thrill it is to see that flash of little blue wings and know that we have been instrumental in this lovely survival story, possible perhaps only because through the cooperation of the adoptive parent bird we had managed to successfully return to the wild that which rightfully belonged there! ⬍⬍

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Please Check Your License

If you have been fishing since August 1, 1970, on a combination hunting-fishing license, it expired at midnight July 31. New combination hunting-fishing licenses are already available at your license dealer, and when you pick up your new one, the dealer will provide you with a copy of the 1971-1972 hunting regulations. Hunting licenses also expired July 31. Fishing licenses, however, are valid on a calendar year basis and will expire December 31.

Muskie Again?

In an attempt to reestablish the muskellunge as an important game fish species in North Carolina, the Wildlife Resources Commission has stocked muskellunge fingerlings in the French Broad River below Asheville and in the Hiwassee River below Mission Dam. "Muskie" fry were obtained from the Pennsylvania Fish Commission, and were raised to stockable size at the Wildlife Commission's Table Rock Hatchery near Morganton. Muskellunge are native to a few Western North Carolina streams, but are believed to have been almost extirpated by stream pollution. The Quaker State muskies are of the same variety as those native to North Carolina.

Dove, Marsh Hen Season Set

From a framework of dates and bag limits offered by the U. S. Bureau of Sport Fisheries and Wildlife, the Wildlife Resources Commission has selected the following for North Carolina:

Doves September 4 to October 9, and December 13 to January 15
Rails (King, Clapper, Sora and Virginia): September 1 to November 9
Gallinules September 1 to November 9

Bag limits for doves are 12 daily, 24 in possession; for rails and gallinules 15 daily, 30 in possession. Dates and limits for woodcocks, snipe, ducks, geese, etc. will be announced later.

Wild and Beautiful Smith Island

Photo Feature by Jack Dermid
University of North Carolina
Wilmington

SMITH Island, lying at the mouth of the Cape Fear River, is in reality a complex of islands separated by vast expanses of salt marshes, mudflats, tidal creeks, and shallow bays. There are about 3,000 acres of high land and about 12,000 acres subject to flooding by tides. Bald Head, the largest and most southern island, has been the subject of many controversial newspaper articles in recent months. The Carolina Cape Fear Corporation has purchased Bald Head and the lesser islands and plans to create a resort development. On the other hand, Governor Robert W. Scott and Gilliam K. Horton, Chairman of the Board of Conservation and Development, backed vigorously by conservationists throughout North Carolina, are pushing for public acquisition.

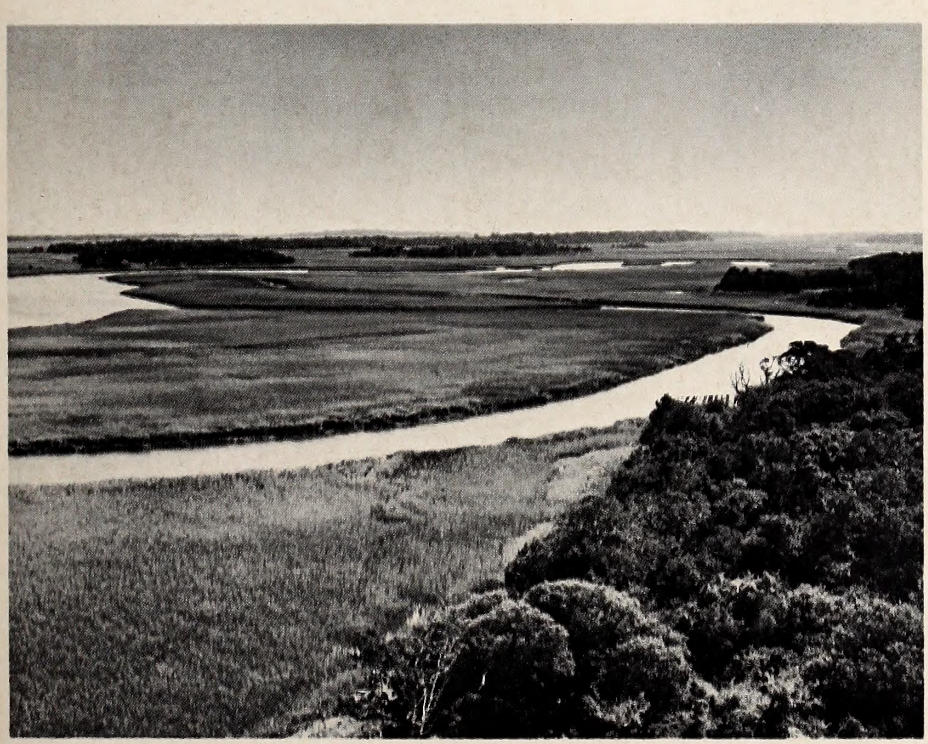
"The owners have proceeded with plans for a high density resort type development that would completely change the character of the island and which would do extensive damage to the estuaries and marsh areas surrounding the island," Governor Scott stated in his Environmental Message to the 1971 Legislature. "My proposal to you today is that the State initiate condemnation proceedings to bring Smith Island into state ownership."

The fate of Bald Head now rests with the people of North Carolina. If they want Bald Head preserved in its natural state for all people to enjoy for all time, they should urge state officials to take the necessary action through letters and telegrams and they can contribute money toward its purchase. Or they can stand idly by while the last truly wild island in southeastern North Carolina becomes just another resort. The time to act is now!

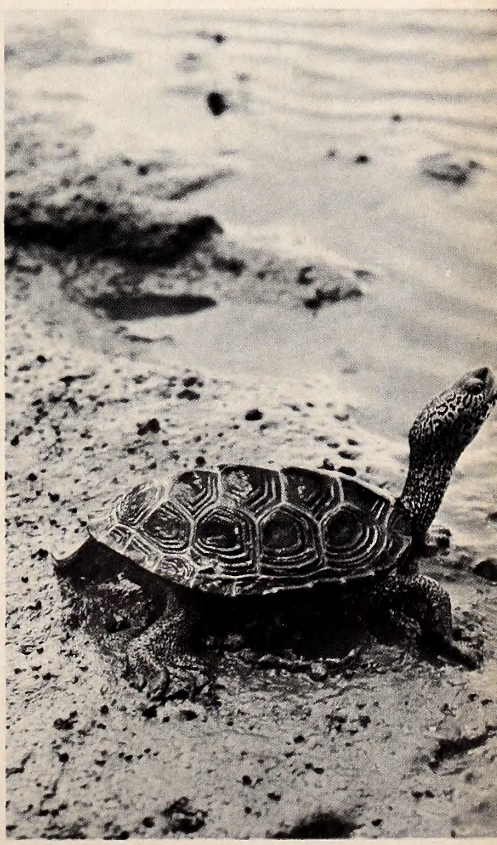
Funds necessary to purchase Bald Head are substantial, and private contributions would help immeasurably toward public ownership. The Conservation Foundation of North Carolina has recently been established to accept contributions which should be sent to Mr. Carl Renfro, Treasurer, 301 LaFayette Drive, Wilson, North Carolina 27893. Checks should be made out to the Conservation Foundation of North Carolina, and contributions are tax deductible.

In the event Bald Head cannot be acquired, the Conservation Foundation will utilize the funds contributed toward the purchase of other wild lands for public use.

The Great Forest. Bald Head supports the last extensive maritime live oak forest in our state. It is a stable community which ecologists believe will be destroyed with development. Below, a lone willet seems to guard his domain from a weather-shaped cedar.



Thousands of acres of productive salt marshes, laced with tidal creeks, provide food and nursery areas for game and shellfish. What happens to these when the dredges begin? This view is from the lighthouse toward Middle Island.

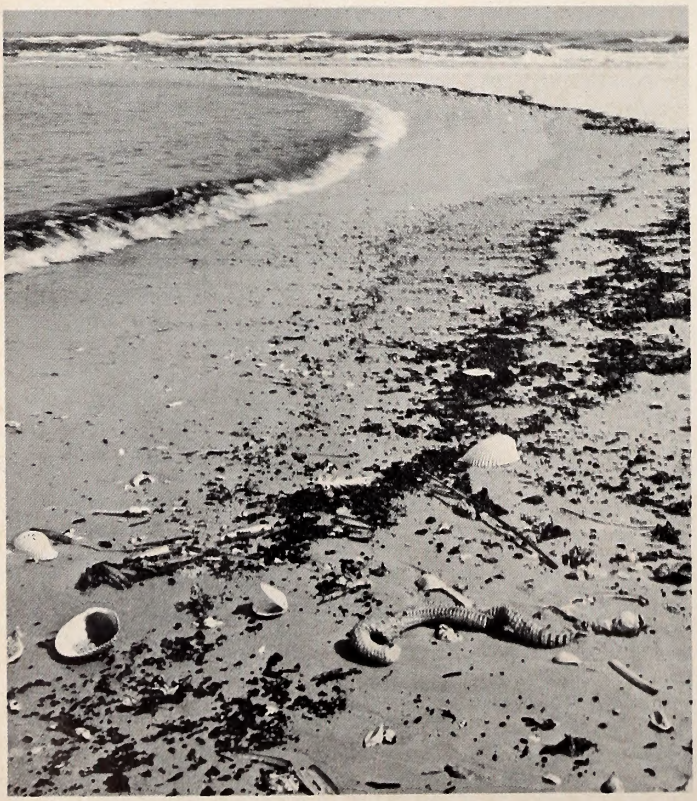


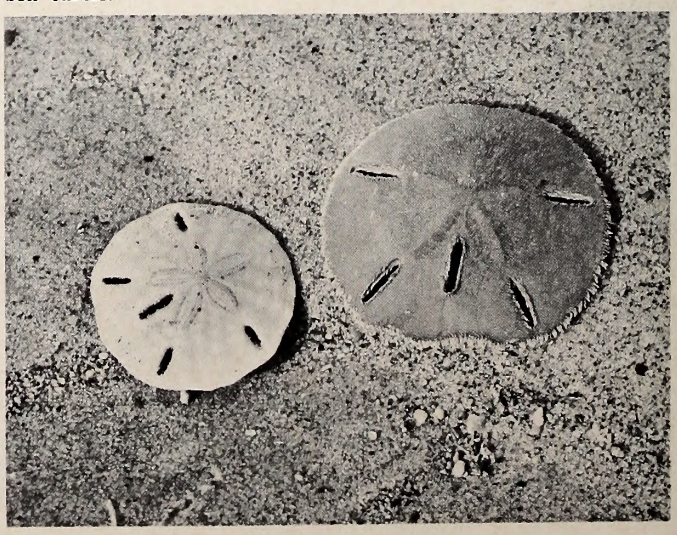
Salt marshes and mudflats support a variety of life quite different from that of the forest. This diamondback terrapin is but one of the species which would be displaced if not totally destroyed by development. Smith Island is an extensive natural laboratory for studying ecology.

A flock of royal terns flies over the tossing whitecaps off the east beach. The beaches of Bald Head, particularly during the spring and fall migrations, teem with birdlife.

Wild and Beautiful Smith Island

Cape Fear (left) jutting into the Atlantic, is subject to rough seas and periodic storms which toss an assortment of shells and other marine organisms onto the sands. Old and new sand dollars (below) are but part of the surf's bounty. Many of these beaches are the ancestral egg-laying sites for the sea turtle.





Johnston County Wildlife Club Observes Anniversary

by Jim Laughter
Staff Writer
Smithfield Herald

A front page article in the January 29, 1946, issue of the SMITHFIELD HERALD reported the following:

"Organization of a Johnston County Wildlife Club to be affiliated with the North Carolina Wildlife Federation will be completed at a meeting here Thursday night, February 7, at the Legion Hut, sponsors of the movement announced today."

A group of 55 Johnston County hunters, landowners, and fishermen attended that meeting over 25 years ago. Forty-eight of those present paid their dues and became charter members of the Johnston County Wildlife Club.

May 26, the Wildlife Club celebrated its 25th birthday with a Silver Anniversary meeting at the clubhouse. Special guests who participated in the program included Clyde P. Patton and Miss Lunette Barber.

Mr. Patton is Executive Director of the N. C. Wildlife Resources Commission. He presented to the Johnston County Club the President's Award for outstanding service in the field of natural resources management during the 1970 year. Only 18 local clubs in the nation received the award.

Miss Barber, a resident of Cleveland Township, was the guest speaker at the anniversary meeting. She was the first woman to join the Johnston County Club, and she worked with the Division of Education of the N. C. Wildlife Resources Commission for many years.

The Wildlife Resources Commission did not exist when the Johnston County Club was born. In fact, one of the stated goals at the first meeting was to help the Wildlife Federation in its drive to separate the Game and Fish Division from the Department of Conservation and Development.

Separation was achieved a year later, primarily through the efforts of the Johnston County Wildlife Club and dozens of other clubs throughout the state. The Wildlife Resources Commission was born as an agency for the sportsman, an agency to be financed entirely by hunting and fishing licenses fees and to be run by men with a concentrated interest in North Carolina's wildlife resources.

In the next few years, the Johnston County Wildlife Club sponsored several other public interest projects. Among those were: sponsoring countywide wildlife habitat improvement projects developed with the assistance of 4-H club members and county landowners; persuading Carolina Power and Light Company officials to build a shad ladder at Quaker Neck to protect shad migration; and helping with the acquisition of the boating access area at Richardson Bridge.

Clubhouse Built

The Wildlife Club began to turn inward in the mid-1950's to devote more time and energy to self-improvement. During this period the club lake and adjacent clubhouse were built.

With its internal affairs on solid ground the Wildlife Club switched its efforts back to countywide matters in the late 1950's. Since then it has become one of the outstanding public service organizations ever created in Johnston County.

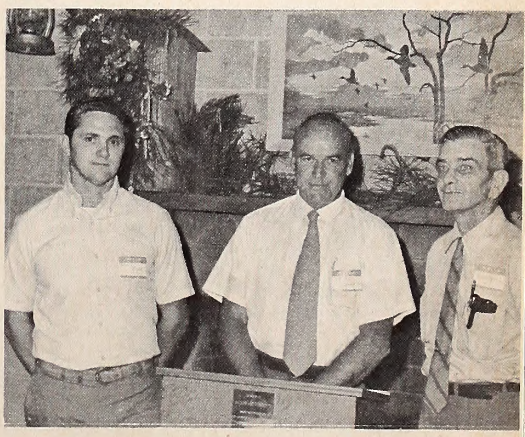
Continuing projects that the club now sponsors include: Boy Scout Troop 31, the Hackney Deer Restoration Area in southeastern Johnston County, an annual dove hunt, and leadership in opposing the channelization of Mill and Hannah Creeks.

The deer restoration project is the first of its kind anywhere —an attempt to create a deer

• **continued on page 26**

Macy Hoyle, longtime conservationist and club leader cuts the anniversary cake during the observance.

Current Johnston County Wildlife Club officers shown are Wayland Jones, Jr., (center) President; Bobby W. Bryant (left) Second Vice President; J. T. Stallings, Secretary-Treasurer.



PLANT PROTECTION AND THE LAW

by David M. DuMond

Botanist - naturalist David DuMond presents some food for thought concerning our dwindling plants and the needs for protecting them.

VENUS'S FLY TRAP

PHOTO BY JOEL ARRINGTON

LEGAL protection of species has come about as a direct result of human superabundance and as an indirect result of a bit of humaneness. Most of the species now protected by law are animal species, which are either most like man or have generally captured his fancy by their uniqueness or rarity or both. Many last-minute attempts to save seemingly doomed species are now under way. The success of these attempts is up to man, time, and nature.

There are many other species which are in danger of extinction, or will be in the foreseeable future, species much less like the human kind, but equally deserving protection. These other species have their places of importance in the ecological scheme, some to a greater extent than presently protected species. The species of which I am talking are those of the plant kingdom.

Considering that legal protection of species is the only alternative to extinction, it is this recourse we should pursue with all due haste. Protection by law for plant species outside government parks, forests and natural areas has been woefully neglected. North Carolina is no exception, as will become apparent in the rest of this commentary.

Present Laws

The present laws regarding the protection of plant species in North Carolina (General Statutes of North Carolina: Chapter 14; sections 128, 128.1, 129, 129.1) are confusing, and in some cases, contradictory, incomplete, and very inaccurate. The following is a direct quotation of these laws as they presently stand.*

*An additional law not covered in this article is designed specifically for protection of sand dunes (and dune plants) along the Outer Banks (1969 Cumulative Supplement to the General Statutes of North Carolina: Chapter 104B; sections 3—15). Protection lines may be drawn by county commissioners in those areas where dune stabilization is of concern. A shorelines protection officer is appointed.

§ 14-28. Injury to trees, crops, lands, etc., of another.—Any person, not being on his own lands, who shall without the consent of the owner thereof, willfully commit any damage, injury, or spoliation to or upon any tree, wood, underwood, timber, garden, crops, vegetables, plants, lands, springs, or any other matter or thing growing or being thereon, or who cuts, breaks, injures, or removes any tree, plant, or flower, shall be guilty of a misdemeanor and, upon conviction, shall be fined not exceeding five hundred dollars ($500.00) or imprisoned not exceeding six (6) months, or both in the discretion of the court: Provided, however, that this section shall not apply to the officers, agents, and employees of the State Highway Commission while in the discharge of their duties within the right-of-way or easement of the Commission. (Ex. Sess. 1924, c. 54; 1957, c. 65, s. 11; c. 754; 1965, c. 300, s. 1; 1969, c. 22, s. 1.)

§ 14-128.1. Unauthorized cutting, digging, removal or transportation of certain ornamental plants and trees.—(a) As used in this section, the words "ornamental plants or trees" shall mean any venus fly trap (Dionaea muscipula), trailing arbutus, American holly, white pine, red cedar, balsam, hemlock or other coniferous trees, flowering dogwood, mountain laurel, rhododendron, ground pine, Christmas greens, Judas tree, leucothea, azalea, or any other ornamental plant or ornamental tree, or any part thereof.

(b) No person shall cut, dig up, break off or otherwise sever from the lands of another within this State any ornamental plants or trees without first procuring and having in his possession a bill of sale or written permit executed by the owner or the duly authorized agent of the owner of the land from which such ornamental plants or trees are being cut, dug up, broken off or otherwise severed.

(c) No person shall transport on the streets, highways or public roads of the State more than

two ornamental plants or trees taken from the lands of another in this State without having in his possession a bill of sale for the purchase thereof, if purchased, or written permit, if acquired pursuant to such permit: Provided, however, this paragraph shall not apply to common carriers.

(d) Such bill of sale or written permit described above shall be carried by the person having possession of said ornamental plants or trees and be exhibited to any duly authorized law enforcement officer at his request; provided that it shall not be necessary for the owner or duly authorized agent of the owner of the land from which said ornamental plants or trees were taken to carry a bill of sale or written permit.

(e) This section shall not apply to the owner or duly authorized agent of the owner of the land from which said ornamental plants or trees were taken: Provided, further, no person charged with violating this section shall be convicted if he produces at the trial the bill of sale or permit described in this section with respect to the transaction in question regardless of whether such bill of sale or written permit was secured before or subsequent to the time of the alleged violation of this section.

(f) Any person violating the provisions of this section shall be guilty of a misdemeanor and upon conviction thereof shall be fined or imprisoned in the discretion of the court; provided that the terms of this section shall apply only to the following counties: Alleghany, Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Craven, Dare, Davidson, Forsyth, Franklin, Gaston, Graham, Guilford, Haywood, Henderson, Hoke, Jackson, Lenoir, Macon, Madison, McDowell, Mecklenburg, Mitchell, Pitt, Polk, Randolph, Stokes, Swain, Transylvania, Wake, Watauga, Wayne, Wilkes and Yancey. (1963, c. 603.)

§ 14-129. Taking, etc., of certain wild plants from land of another.—No person, firm or corporation shall dig up, pull or take from the land of another or from any public domain, the whole or any part of any venus fly trap (Dionaea muscipula), trailing arbutus, American holly, white pine, red cedar, hemlock or other coniferous trees, or any flowering dogwood, any mountain laurel, any rhododendron, or any ground pine, or any Christmas greens, or any Judas tree, or any leucothea, or any azalea, without having in his possession a permit to dig up, pull up or take such plants, signed by the owner of such land, or by his duly authorized agent. Any person convicted of violating the provisions of this section shall be fined not less than ten dollars ($10.00) nor more than fifty dollars ($50.00) for each offense. The provisions of this section shall not apply to the counties of Cabarrus, Carteret, Catawba, Cherokee, Chowan, Cumberland, Currituck, Dare, Duplin, Edgecombe, Franklin, Gaston, Granville, Hertford, McDowell, Pamlico, Pender, Person, Richmond, Rockingham, Rowan and Swain. (1941, c. 253; 1951, c. 367, s. 1; 1955, cc. 251, 962; 1961, c. 1021; 1967, c. 355.)

Local Modification.—Avery, Mitchell and Watauga: 1867, c. 355.

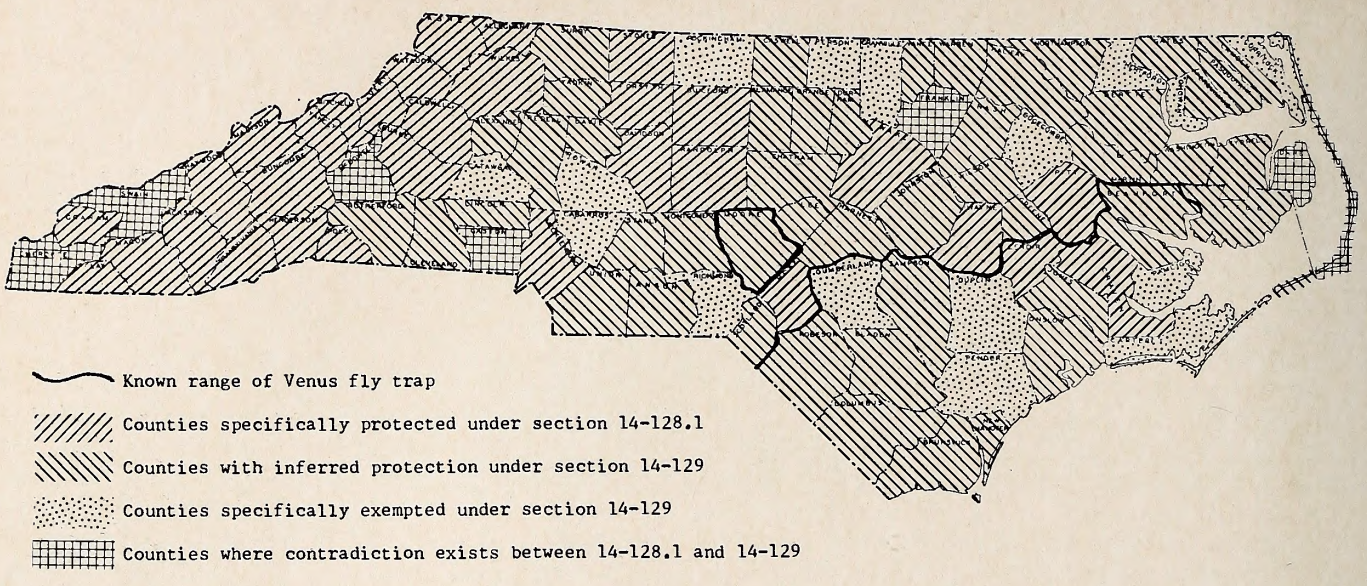
Editor's Note.—The 1967 amendment deleted "Mitchell" from the list of counties in the last sentence.

§ 14-129.1. Selling or bartering venus flytrap.—In order to prevent the extinction of the rapidly disappearing rare and unique plant known as the venus flytrap (Dionaea muscipula), it shall be unlawful for any person, firm or corporation to sell or barter or to export for sale or barter, any venus flytrap plant or any part thereof. Any person, firm or corporation violating the provisions of this section shall be guilty of a misdemeanor punishable by a fine not to exceed five hundred dollars ($500.00), imprisonment for not more than six months, or both: Provided, this section shall not apply to the sale or exportation of the venus flytrap plant for the purposes of scientific experimentation or study when such sale or export for such purposes has been authorized in writing by the Department of Conservation and Development. Provided further, that this section shall not prevent any person from selling or exporting for sale any venus flytrap plant which such person has cultivated domestically under controlled conditions if the person so cultivating such plants has obtained his original stock of plants either from his own land or from some lawful seller and has obtained written authorization for selling such plants from the Department of Conservation and Development. (1951, c. 367, s. 2; 1957, c. 334; 1969, c. 1224, s. 11.)

The first section of these laws (14-128) seems adequate to give legal protection to every living and non-living thing that occurs on the property of another, maintaining it as untouchable by any non-owner. It is our opinion that a law with such a broad scope is essentially vague and unreliable as a method for dealing with the problem at hand. If a person were to take a casual walk through a pine forest not owned by himself and were to displace a stone or a stick or were to crush a pine needle or brush a leaf from a shrub, he would, under the tenets of this law, be guilty of a misdemeanor. This law could act as a deterrent to appreciation, and, hence, preservation of nature. Unless this section is to serve as a general "no-trespassing" law, the use of such terms as *willfully* is not sufficient for protection, and the use of such terms as *damage, injury* and *spoliation* lack specificity. The point is, when "damage" is wrought on plants the act is not, in all cases, willful. This is to say, it is not done knowingly, for common knowledge of what constitutes plant damage is not necessarily correct or complete. The word *willfully* connotes need for an ascertainment of individual enlightenment on the subject, in this case, of ecology.

Although this law may serve as a fine supplement to other laws regarding trespass or littering, it is not felt that, as worded, it is specifically designed to give protection for plants of the State.

SUMMARY OF COUNTY COVERAGE BY NORTH CAROLINA PLANT-PROTECTION LAWS



The map summarizes the extent of the laws for protection afforded the species alluded to in the text of the next two sections (14-128.1 and 14-129). The need for refinement of these laws is obvious for several reasons.

The list of species is entirely inaccurate (with the exception of *Dionaea muscipula*) due to the lack of Latin binomials—scientific names. Common names are simply not sufficient in legal procedure for defining species, not when common names and vernacular names vary throughout the state for any one species. Widely established common names can be used with greater ease, but each should be explained by a taxonomically correct scientific name.

The list contains at least six very common species: trailing arbutus (*Epigaea repens,* found in 72* North Carolina counties); American holly (*Ilex opaca,* found in 90 counties); red cedar (*Juniperus virginiana,* in 69 counties); flowering dogwood (*Cornus florida,* 91 counties, also the state flower); mountain laurel (*Kalmia latifolia,* 71 counties); Judas tree (*Cercis canadensis,* 50 counties). White pine (*Pinus strobus*) and ground pine (*Lycopodium obscurum*) are not truly rare, though ground pine may well approach rarity. White pine is a species limited to the mountains, and in these locations is one of the most common trees. Rare occurrences of white pine are located in Chatham and Lee counties.

The other names employed to designate protected plant materials in North Carolina are interpreted as follows:

'Balsam'—two species often bear this name, *Abies fraseri* (Fraser's fir) and *Picea rubens* (red spruce); limited to high mountains of the state.

'Hemlock'—two species, *Tsuga canadensis* (Canadian hemlock) and *T. caroliniana* (Carolina hemlock), both very common in the mountains.

'Other coniferous trees'—a total of 13 other species in this state.

'Rhododendron'—generally thought of as three species of evergreen broadleafed shrubs of the genus *Rhododendron,* all quite common in the mountain counties.

'Christmas greens'—possibly *Lycopodium flabelliforme* (also called running pine), the most common of this genus in our state.

'Leucothea'—three species in this state of the genus *Leucothoe.*

'Azalea'—eight species of deciduous shrubs of the genus *Rhododendron.*

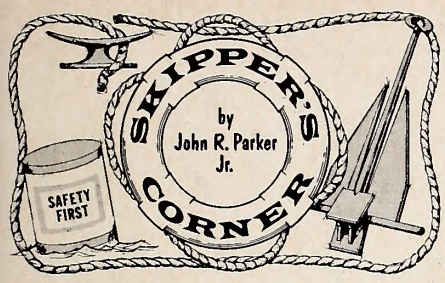
'Ornamental plant or tree'—could conceivably be interpreted to be any member of the plant kingdom.

To summarize, there are two great faults in this list: (1) the lack of specificity in the naming of plants, (2) the employment of abundance rather than rarity as a criterion for protection. Admittedly, there are many problems glossed over or hidden by these two statements, but truly rare plants are a great natural resource for the state and deserve adequate protection by law.

The plants listed in these two sections of the law are not protected in many of the counties of the state. The map shows that 14-128.1 covers only 31 counties. Forty-seven counties may have protection by their absence from the list in section 14-129. Sixteen counties are specifically excepted from the provisions of 14-129, and six of these counties are named in section 14-128.1! For six counties the laws are contradictory and for 16 counties there are no laws at all. Five of the counties without laws are within the known distribution range of Venus's Fly Trap, the major species around which these

• **continued on page 27**

*Numbers taken from Radford, et al. (1968) represent a minimum of counties in which these species occur.



YOUR boat, motor and trailer, new last season, have recently had their first birthday. What has a year of use and weathering done to that bright, gleaming rig of which you were so proud? Such is the situation around the Parker marina (that's my gaage), 110 hours of use according to the engine hour meter, so let us consider the topic together.

A lot of things can happen to a boating rig over the period of a year; some things detrimental, some beneficial. Many of the detrimental things can be prevented by reasonable care and in some cases just a little more than average effort. A big first step involves storage. Completely covered storage is best. While a boat generally does not depreciate as rapidly as does an automobile, even the highest quality boat will show early signs of weathering, with trade in dollars knocked off accordingly. So, provide some type of cover: garage, canvas or shed down in the back forty. Around our house the family car sets out!

As for general house cleaning, a little wax, lots of water, and a little oil or grease takes care of most of the needs. I wax the hull of my fiberglass 19 footer at least once a year with a good grade of boat wax. Decking gets several waxings during the high-use periods. I also keep a fine grade of rubbing compound handy for those jel coat "bruises" that the wax doesn't clean up. Soap and water are needed, this goes without saying, and except in extreme cases, on rough work, no abrasive cleaners! If your boat has a bilge compartment, there are several special cleaners on the market for that area. In fact, many marine dealers have racks of cleaners with a different can for almost every part of the boat.

After salt water fishing trips, I wash down the entire rig, boat, motor and trailer. That sounds rather simple but I mean hold the hose on the rig until you are tired, then do it longer. Hose down everything but under the hood and electrical components. This time and water will pay dividends in the long run. A mop, sponge, bucket, and some old towels are good items to have aboard even the smaller runabouts, especially if used for fishing.

Earlier I mentioned that grease was a part of the preventive maintenance kit. A grease gun, lever actuated type, that sells for $5 to $6 depending on where you buy it, is a must if you plan to do your own maintenance. It is especially necessary for grease fittings on trailer wheel bearings, heavy motor fittings, trailer roller fittings, etc. Of course, a suppy of manufacturers' recommended grease for motor and lower unit should be on hand. Back to the trailer for a moment; I use automobile rear-end oil, about 90 weight, for rollers that have no grease fittings. Seems to work a little better than, say the machine oil you might have handy.

As for damage or unusual wear, it has been my observation that the forward part of the keel gets the roughest treatment, primarily from beaching. I simply refuse to beach my boat on shell, gravel or rocky shores. A pair of anchors and, if necessary, a wade to shore will save lots of jel coat. Other tricks will save the keel; as an example I have placed drift wood under the keel when unloading from the bow on inland lake camping trips thus keeping the keel up off the rocks.

Docking a mite too fast has caused some nasty blows to many a gunnel. The rule here is to move in *very slowly;* have fenders available if the dock is not padded or does not fit your boat. Be especially careful around concrete pilings as they can chew up aluminum or vinyl insert gunnel stripping in seconds.

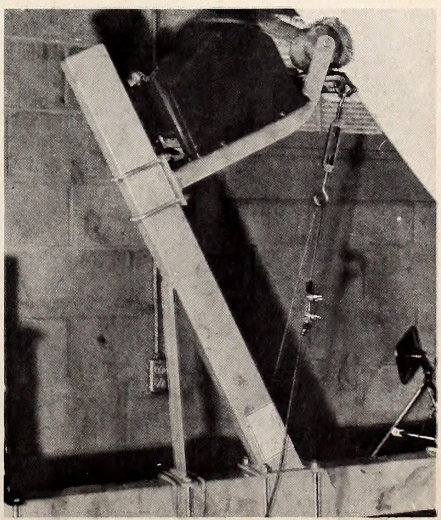
The motor skeg and prop is an area that often receives some terrific blows. Sometimes these knocks are unavoidable but that "sharp watch" for shoal water and floating debris can reduce the chances of this type of damage. Small nicks in the prop can be filed away so long as the same amount of material is taken from each blade. If in doubt about such repair, consult your marine dealer.

In loading your boat on the trailer be very careful she sets properly on the rollers. To winch the boat up along metal supports could result in long deep gouges in wood or glass.

There are other things that can happen to your rig that may be less noticeable. For example: Guests who don't know *not* to jump onto decks or swing on windshields, tie dock lines to railings, cut bait on the highly waxed deck or to twist a grit laden shoe on exposed surfaces can cause sorrow. All of these things plus others may have happened during that first year and thereafter unless you take necessary precautions. A tactful skip-

• **continued on page 27**

For safety, many skippers back up the winch click or cable drum brake by lacing line through the bow eye and tying it off at the trailer tongue or around the winch stand. It utilizes a large turnbuckle, cable and clamps. Best tie-down for your rig can be achieved by varying the angle of the cable.



Canine Conservationists On Trial

by John R. Parker, Jr.

PHOTOS BY THE AUTHOR

Last October, Lake Mattamuskeet was the scene of North Carolina's first AKC sanctioned retriever trial. The event was sponsored by the East Carolina Retriever Club.

IT had been about 20 years since my first trip to the marshes of Mattamuskeet Lake, the good old days of my generation. I really don't recall that I knew what to expect on the first hunt. But like any boy in his early teens venturing forth on his first trip to a nationally famous waterfowl hunting and refuge area, I'm sure that I was excited and nervous. And when I cease to be just a little that way about each waterfowl hunt, as we say, I'll hang up my gun.

No, I can't recall my expectations about that first trip, but I feel confident that I left the Lake satisfied. After all, I was duck and goose hunting with my dad at Lake Mattamuskeet. For what more could a boy ask?

These were some of my thoughts as I again headed for the Lake one rain-soaked afternoon last October. There had been many trips since that first one but there was one striking similarity between the two. I really did not know what to expect upon arrival at the Lake on this trip either. Now as many of you know, we have had no early experimental waterfowl season in the state, and as mentioned, the weather was lousy (for fishing). Actually, I was to cover a retrieving dog field trial for this magazine. And as an employee of the Wildlife Commission and as one who has owned several retrievers, I am just a wee bit embarrassed to admit that I really did not know what to expect upon arrival.

Until recently, my retrievers received their field trial about a week before the season opened. You know the scene: the place, your backyard; the action: "Fetch the stick boy; that's a good dog; that's good. Come on. Hey! Bring that back here you dumb mutt," etc. Exaggerated? Perhaps. But you know the story.

Any hunting dog, in this case a retriever, worth a dozen or so sacks of food certainly deserves more training time than described above. You may plan to use the animal for hunting, for field trials, or for show; it matters not. The more time and patience you give the dog, the more you will enjoy owning and working with the animal and the less you will complain about paying his board. The dog deserves it and certainly your trips afield deserve, often require, a trained canine companion.

How much training? Well, according to those who should know, it only takes 10 minutes a day. This amount of time will give you a well-trained hunting dog (gun dog) or lead toward a field trial champion. Much of this, of course, depends on the natural abilities of the pup you selected from the litter.

What's a field trial champion? That's one of those four-legged conservationists, which to the layman at least, apparently knows as much about the hunt or the trial as does the fellow with the whistle around his neck. Joking a bit, but such animals are truly impressive.

It was this type of dog flesh that I was to rendezvous with at the Lake Lodge, headquarters for the meet. Of course, their handlers and/or owners were there too, along with other dog lovers. It was this type of trained retriever that stirred my interest and made me really start wondering what to expect. My hopes started building; then the critters lived up to their reputations.

What was a first for me was also a first for our state in one respect as the Lake was the scene of the first American Kennel Club sanctioned retriever field trial held in North Carolina. Although the weather left something to be desired, especially for the gallery and photograpers, the setting could not have been better. From time to time during the trial, all eyes would occasionally be lifted to view a flock of geese flying over as if in salute to the proceedings. Those contemplating entering must have considered the setting desirable also, as entries arrived from four other states: Maryland, Virginia, Tennessee and South Carolina.

The trial was hosted by the East Carolina Retriever Club. This club is the newest in the state, being organized only a half dozen or so months before the October 31 event. As well as being the newest club in the state, according to my information, it is one of only two in North Carolina. The other club is based in Durham and goes by the name of the Piedmont Retriever Club.

Membership in the East Carolina Club comes primarily, as you would expect, from an area extending roughly from Rocky Mount to Raleigh and southeast to Wilmington. Many of the approximately 55 members live in the Kinston-Greenville area. However, the club does boast a few out-of-state members.

While I was acquainted with several of those in attendance, my obvious choice during and after

First Place in the Puppy Derby and Open events, respectively, are (left to right) Hattie, owned by Eddie Wheatly of Grandy; John, owned by Veronese Atkins of Pinehurst; and Blackie, owned by Mike Thompson of Durham.

the event as an information man, was the club president, Dr. J. M. DuBose of Kinston. I had many questions for Dr. DuBose, a field trial man of considerable renown himself.

Fifty-six dogs were entered in the trial. Most of these dogs were, of course, the very popular black Labrador with a few yellow labs and one handsome chocolate-colored lab entered. Being a Chesapeake owner, I searched hopefully for this breed in the line up but only one was entered and that one in the puppy class. I later told the good club president that we would have to do something about the absence of undersold "Chessies." He, being an owner of champion labs looked at me in disbelief and sort of chuckled.

There are six recognized breeds that can be entered in a sanctioned retriever trial: Labrador, Chesapeake, Golden, Flat-Coated, Curley-Coated, and the Irish Water Spaniel.

One question that I had carried to the Lake with me with some memory of a recent bird dog trial was simply, what is the purpose of all of this? A competition, yes, but why? To this, club president DuBose replied that the trial does demonstrate on a competitive basis, proficiency in training and retrieving with considerable attention to details regarding hunting ability and overall polish. He went on to say that as well as offering this opportunity of friendly competition among owners and handlers, and helping save lost game, when the animals are used in actual hunting, that field trial competition and selective breeding quite obviously helps promote a better breed. Too, it was Dr. DuBose's opinion that the field trial champion could make a good hunting dog, but that Old Joe, your pride fetching companion, would not necessarily make a field trial champion—regardless of how many ten-minute periods you spent with him.

How well trained does your animal have to be for you to consider entering him in a field trial? As I understand it, your dog must be under control,

Eddie Wheatly sends out his lab, Hattie, for a retrieve. Hattie was the Puppy Class winner. Below, Blackie gets a look of appreciation for his Open Class win from owner/handler Mike Thompson. Blackie took top honors in a field of 22 starters.

Part of the competition took place on newly constructed marsh impoundments. Participants and onlookers braved all-day rain showers to view the event. Left foreground, mallards are tethered for retrieving.

obviously, he must be trained to mark a fall, not retrieve until sent, and of course, make the retrieve and return under control.

Beyond this, training that any good gun dog should have will put on that polish mentioned above and start you toward field trials.

After giving some thought to what I saw on the rain-soaked fields and open marshes of Hyde County, it occurred to me that there is some "man training" as well as dog training that must take place. It seems to me that the fellow with the whistle, be he a professional handler or amateur, must also discipline himself. He must really get to know his animal, know when to apply pressure, when to let it rest and try again tomorrow and on and on. My opinion, based on very little experience, is that the rewards are there but they don't come without a lot of work.

It is not my intention here to describe just how a retrieving dog trial is carried out. However, basically a series of land and water courses are set up varying in difficulty and retrieves are made on tethered ducks or shot pigeons. Difficulty is increased by varying marsh or field terrain, adding obstacles, decoys, and of course, depends upon the number of "kills" that a dog must mark (remember) on a given course.

The age of the dog determines for the most part what is in store for him as he waits on the line with his master. To enter the *puppy class* competition, the retriever must be under one year of age; it may be restrained on the line and is expected to make only one land and water marked retrieve. The *derby class* requires that a retriever be under two years of age; must be able to make double marked retrieves and must be steady on the line. The *open class* is for the advanced dog. At this point, you really have Old Joe polished. He must be capable of marking and retrieving three falls; must be handled by hand and whistle signals to a blind retrieve (hidden bird) and must be capable of honoring the work of another retriever without breaking and trying to get in on the act.

As you would expect, it was the advanced dogs that drew most of the attention. It was indeed fascinating to watch top dogs make those difficult retrieves, going out and returning with a mouth full of live mallard showing not a tooth mark. They do it primarily because of "faith" in their handlers that there is, in fact, something out there, according to one authority. It was equally fascinating to watch a dog working, say a 100 yards away, setting immediately upon the sound of the handler's whistle and waiting a hand signal to go left or right or go further out, etc. That's the polish for which you strive.

And how much money does Old Joe bring home for all this polish and all your effort? Not a cent. Satisfaction, and trophies in the form of cups and trays and ribbons make up the rewards. Of course, we can toss in valid things like challenge, companionship, etc., that go with any type of competition.

There was satisfaction from various quarters last October at this first AKC sanctioned trial for North Carolina. The winners (see list) needless to say were satisfied; and the host club, I was later told, was most satisfied with the meet, including the cooperation of John Davis and other Fish and Wildlife personnel at the Federal refuge. Much of the trial, incidentally, was run on new marsh impoundments recently developed to help the Lake make a waterfowl come back.

In fact, the next AKC sanctioned trial, also sponsored by the East Carolina club, will be at the Lake this coming October. In spite of the rain, the onlookers seemed well satisfied due mostly to the dog work, the competition and also the hospitality of local folk including food specialties of the area.

Finally, there was again satisfaction for this visitor to Hyde County and the Lake. It is always good to return—and on this trip those canine conservationists had lived up to any and all expectations. ⬍⬍

WINNERS

OPEN: (22 Starters) Judges: Colon Byrd, Veronese Atkins
1st: Blackie, L.F., Mike Thompson, Durham, N. C.
2nd: Ginger, L.F., Bachman Doar, Richmond, Va.
3rd: Harth L.F., Bachman Doar, Richmond, Va.
4th: Kace, L.M., Jerry Mount, Orangeburg, S. C.
JAM's: Duchess, L.F., Dr. J. M. DuBose, Kinston, N. C.; Dolly, L.F., Tom Lackland, Columbia, S. C.; Duchess, L.F., John Adams, Greenville, N. C.; Bonny, L. F., "Ducky" Muse, Johnson City, Tenn.

DERBY: (18 Starters) Judges: Henry Miller, Dr. Ed Clement
1st: John, L.M., Veronese Atkins, Pinehurst, N. C.
2nd: Sherman, L.M., Scott Roberts, Kinston, N. C.
3rd: Bag, L.M., Dick Perkins, Richmond, Va.
4th: None
JAM's: None

PUPPY: (16 Starters) Judges: Dr. Bill Erwin, Dr. Clyde Potter
1st: Hattie, L.F., Eddie Wheatley, Grandy, N. C.
2nd: Tappy, Gold.M., Mauck, Richmond, Va.
3rd: Char, L.M., Kent Sweezy, Chestertown, Md.
4th: Charlie, Y.L.M., Dr. Rowe, Richmond, Va.
JAM's: Deacon, L.M., Kent Miller, Richmond, Va.; Bag, L.M., Dick Perkins, Richmond, Va.; Guinevere, L.F., C. B. Pierson, Richmond, Va.

Billfishing Records

Mack McBryde
Dept. of Conservation & Development

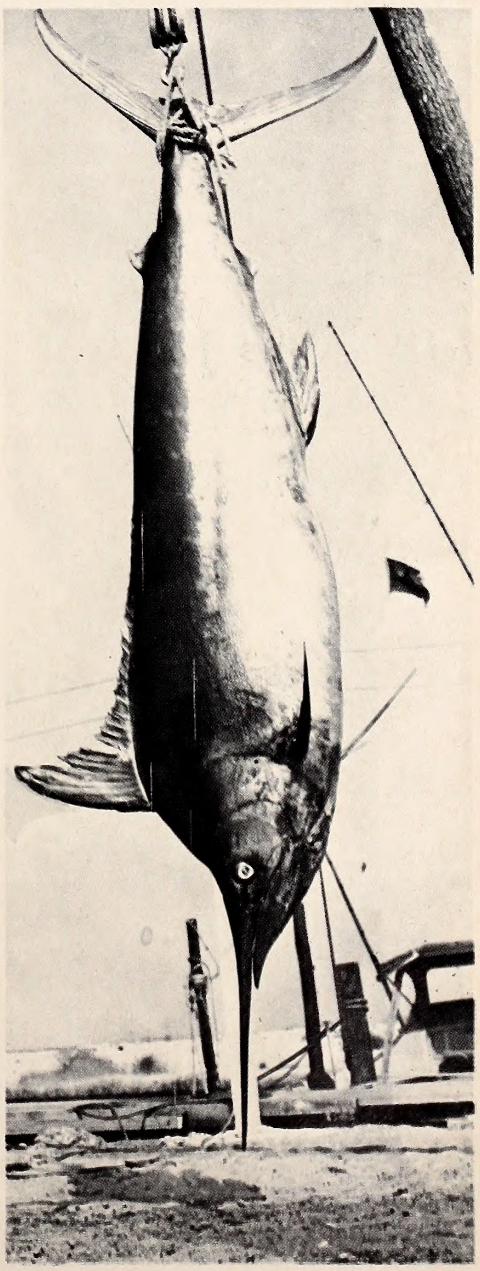
BILLFISHING, i.e. for Blue Marlin, White Marlin, and Sailfish along the North Carolina coastal waters is still an outstanding sport for salt water anglers, although the total catch for 1970 depicts a slight decrease of 288 over the number caught in 1969.

Sailfish caught and landed by anglers increased overall in 1970 over 1969 with the greatest increases in the counties of Carteret, New Hanover, and Brunswick. **Blue Marlin** caught and landed decreased in North Carolina coastal waters; only one county showed an increase and that was New Hanover. Also New Hanover County produced the largest Blue Marlin caught along the Atlantic Coast for 1970, in fact this 705-pound Blue Marlin is a world's record tie for either fifth, sixth, or seventh place for an Atlantic Blue Marlin. **White Marlin** catches also showed a decrease and again New Hanover County increased its percentage while other coastal sections declined in their catch.

The salt water anglers should take note of the fact that a much greater percentage of Blue Marlin and Sailfish were caught than tagged and released. It is hoped that the year 1971 will bring an even greater release percentage. For the conservation-minded angler and charter boat captain, this is the ultimate in sports fishing.

Listed herewith is a breakdown of the billfish caught in North Carolina waters.

PHOTO BY AYCOCK BROWN



1969

	BLUE MARLIN		WHITE MARLIN		SAILFISH		TOTAL	
	Caught	Released	Caught	Released	Caught	Released	Caught	Released
BRUNSWICK COUNTY								
(1) Southport	0	0	3	0	6	0	9	0
NEW HANOVER COUNTY								
(1) Wrightsville Beach and Carolina Beach	7	0	2	0	3	0	12	0
CARTERET COUNTY								
(1) Morehead City	24	0	9	0	36	0	69	0
DARE COUNTY								
(1) Hatteras	140	2	215	50	100	45	455	97
(2) Oregon Inlet	87	4	1,335	415	150	60	1,572	479
	227	6	1,550	465	250	105	2,027	576
GRAND TOTAL	258	6	1,564	465	295	105	2,117	576

1970

	BLUE MARLIN		WHITE MARLIN		SAILFISH		TOTAL	
	Caught	Released	Caught	Released	Caught	Released	Caught	Released
BRUNSWICK COUNTY								
(1) Shallotte Point	0	0	0	0	4	0	4	0
(2) Southport	1	0	1	0	15	0	17	0
	1	0	1	0	19	0	21	0
NEW HANOVER COUNTY								
(1) Carolina Beach	1	0	0	0	0	0	1	0
(2) Wrightsville Beach	26	7	6	0	23	2	55	9
	27	7	6	0	23	2	56	9
PENDER-ONSLOW COUNTIES								
(1) Topsail Island	0	0	0	0	2	0	2	0
(2) Sneads Ferry	0	0	0	0	1	0	1	0
	0	0	0	0	3	0	3	0
CARTERET COUNTY								
(1) Swansboro	0	0	0	0	2	0	2	0
(2) Morehead City	22	0	3	0	57	2	82	2
	22	0	3	0	59	2	84	2
DARE COUNTY								
(1) Hatteras	56	4	32	21	136	45	224	70
(2) Oregon Inlet	114	55	1,180	779	147	65	1,441	899
	170	59	1,212	800	283	110	1,665	969
GRAND TOTAL	220	66	1,222	800	387	114	1,829	980

Dr. William L. Turner, North Carolina's Director of Administration, in May announced the names of 30 college students who have been appointed to the North Carolina Environmental Intern program, a project sponsored by Governor Bob Scott through 10 State Government agencies.

In June the interns were appointed to their positions jointly by the Governor and the agencies.

In his letter appointing the interns, the Governor told them:

"Growing environmental concern across our Nation and State indicates our readiness as a society to seek ecologically responsible development policies at all levels of government activity.

"In our State agencies charged with insuring the environmental future of North Carolina, your active participation will help shape the course of that future," Scott wrote.

The agencies participating in the program are the Department of Conservation and Development; the State Board of Health; the Department of Water and Air Resources; the Wildlife Resources Commission; the State Highway Commission; the Department of Agriculture; the Board of Higher Education; the Marine Science Council; the Department of Administration; and the office of Comprehensive Health Planning of the State Planning Division.

The intern program was established by the Governor in May 1970 to offer opportunities to students for "service-learning" in government and provide manpower for projects of the State agencies. The Environmental Intern Program is coordinated by the North Carolina Internship Office, an agency of the Department of Administration and the Board of Higher Education.

The interns will be working this summer on projects that include research on the effects of stream channeling on fish and fresh water life, water purification, the recycling of metals, the effects of water pollution on shellfish, and a natural areas survey. One intern is studying ways to use construction plans to determine pollution problems new industries would cause.

Stream Channelization

The effects of widespread stream channelization were discussed last spring during hearings before the Subcommittee on Conservation and Natural Resources of the House Committee on Government Operations, the Wildlife Management Institute reports. Witnesses representing many national conservation organizations presented testimony and were questioned by chairman Henry S. Reuss (Wis.) and others.

Environmental degradation and destruction at public expense was the principal argument against the majority of channelization now being carried out by several federal agencies. It was pointed out that channelization is a subversive approach to flood control. Accelerating the release of water through channelization may lessen flooding in the project area but it simultaneously aggravates floods downstream. Another basic contradiction in channelization programs is their justification by placing drained wetlands into agricultural production while taxpayers now pay over $3 billion a year in crop subsidies to keep land out of agriculture. This inconsistency supports the contention of conservationists that the overall benefit: cost calculations used to justify channelization are shortsighted.

Benefits are identified in terms of reduced flood losses locally and/or predicted potential values associated with more intensive land use such as agriculture. No economic values are assigned to an existing stream and its associated flood plain for flood, sediment, and nutrient storage or for fish and wildlife resources.

The consensus of those testifying was that a moratorium be established immediately on channel construction and other drainage measures because projects have been evaluated and planned without benefit of adequate ecological, hydrological, and benefit: cost considerations. One state, Ohio, has already taken such action. William B. Nye, director of the Ohio Department of Natural Resources, has asked the Ohio Water Commission and the Ohio Soil and Water Conservation Commission to hold up any recommendations on channel construction projects. "It is necessary", Nye said, "that an assessment of the effects of channelization projects on the environment be made as part of a complete review of stream channel programs." This step may be taken by other states if federal programs are not ecologically reoriented. ⬍⬍

Wood Duck Follow-up

Dear Sir:

Troop 326 is happy to report as a follow up to our June article on "Operation Wood Duck" that we have already had two hatchings so far this year. Our first observation was on May 29. We noticed that one nest had

been used and we were able to find the mother and five baby ducks. Our second observation was on the weekend of June 12 when we discovered another duck nesting her eggs.

The project of constructing and setting up these boxes was a tremendous experience for our troop with a real climax of seeing new life reproduced from our efforts.

H. Lee Swanson
Assistant Scout Master
Troop 326

Back-country Travel

The National Park Service has published a new booklet entitled "Back-country Travel in the National Park System," and it is available from the Supt. of Documents, U.S. Government Printing Office, Washington, D. C. for 35 cents. It describes back country, tells you where to find it, what to take in the way of equipment, and much more helpful information for the hiker and camper who really want to get away from it all.

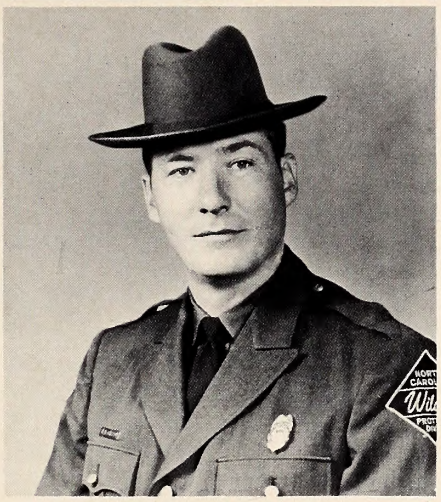
Pamlico-Craven County Area

At least two detailed county maps are available from the New Bern-Craven County Chamber of Commerce of New Bern, N. C. These maps show all of the access points, boat ramps, marinas, etc. from the south shore of the Pamlico River to the Neuse River at New Bern. This is a fine service and would be a great project for other chambers of commerce throughout the state.

Perquimans County Facility

The town of Hertford has recently improved its downtown docking facilities, building new ramps and clearing stumps and other hazards to boaters. The dock is just a few minutes from the downtown shopping area and of course the water—the Perquimans River—is perfection itself for fishing and boating here in Northeastern North Carolina.

KNOW YOUR PROTECTOR



W. B. Chason

Wildlife Patrolman, W. B. Chason, was born June 20, 1938, in Lumberton, N. C. Patrolman Chason is the son of Mr. and Mrs. H. H. Chason of Lumberton. Walton graduated from Lumberton High School and attended Edwards Military Institute.

Chason served with the U. S. Army in European area as a military policeman. He attended wildlife protector recruit school in June, 1966, and was assigned as a wildlife protector trainee in Delco, N. C. in August, 1966. Chason received his permanent assignment as wildlife protector in November, 1966, stationed at Southport.

Walton was promoted to Patrolman August, 1969, and was stationed in Manteo. He has attended five in-service schools held in Chapel Hill at the Institute of Government. Patrolman Chason received the Protector of the Year Award from the Southeastern Association of Game and Fish Commissioners in 1968. He is presently serving as radiological monitoring instructor for District 1.

Chason is a member of the N. C. Association of Wildlife Law Enforcement Officers, the National Rifle Association, and the Southeastern Association of Game and Fish Commissioners, Law Enforcement Section.

Save the Hawks

Dear Sir:

After seeing your cover of the May edition of Wildlife I decided to add my plea to the protection of hawks.

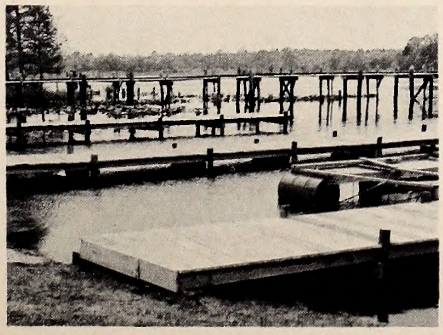
It's a beautiful sight to me when I see a hawk sailing carefree overhead. When I see a hawk, I see what at one time was the king of the sky. However, to some people who see a hawk, they see a chicken thief. It's true that some hawks kill chickens but very seldom. By the number of rats and other rodents they kill, they probably save a farmer more money than they cause him to lose. Those chickens that are killed by hawks are killed by Accipiters (bird hawks) and not by Buteos which make an easy target for an angry farmer. The Buteo hawks include Red Tailed and Red Shouldered hawks that do not kill birds, (including chickens) but kill rodents instead.

When a person sees a hawk flying over his chicken pen it is more likely that it is after rats and not chickens. The usefulness of the hawk far outweighs it's harm.

Hawks where I live are not a common sight. There's one hawk that I watch regularly. Many times when I'm watching this hawk someone will say something like, "My 12 gauge would sure bring him down." When I hear this I find it hard to believe that anyone could kill a King.

Sincerely Yours,
James P. Harkey
Lincolnton

Going fishing or boating? The Hertford area of the Perquiman's River is ready with new docking facilities.



Where'd They Go?

Dear Sir:

Until this spring there has always been a large number of Flickers of the woodpecker family here in the summer, but for some unknown reason this spring there are very few if any. If you have or can get any

information about these birds please let me know.

Yours Truly,
Luther C. Moretz
Boone

The Vulture

The greedy vulture
Just ain't got culture
It's easy to see
Poor manners has he.

He's such a weird bird
And is quite absurd
So as to be fed
He dines on the dead.

He feasts with great glee
On his Cup of Tea
But who eats dead vultures?
Is what mystifies me.
Grace Oliphant

Diminishing Wildlife

Dear Sir:

It is apparent to the writer who is 72 years old that our wildlife is in extreme jeopardy for maybe many causes—could it be that we are using so many insecticides which may cause birth and short longevity that may cause diminishing wildlife such as rabbits, quail, deer, squirrels.

I have just finished mowing some 40 acres of fescue myself and I did not see but two (2) young rabbits. Five or ten years ago, I could do the same mowing and see dozens of rabbits.

Another thing that probably brings to my attention is the fact that I can see more rabbits, squirrels and quail in the city of Greensboro than we can see on our farm in the country.

Your thoughts in this extreme loss of wildlife as to the causes of the diminishing wildlife would be appreciated.

Orton A. Boren
Pleasant Garden

Dear Mr. Boren:

We appreciate your observations on the scarcity of rabbits and the possible effects of pesticides on these and other game species. Considerable research is being done in several states to determine the effect of pesticides on game birds and mammals, but at present the findings are not conclusive.

The concensus among biologists is that pesticides are detrimental to wildlife, notably brown pelicans along the Gulf Coast, and birds of prey throughout the country.

There are rabbits, squirrels, chipmunks, and quail in my neighborhood here in Raleigh, and it is doubtful that many of the neighbors use pesticides for weed or insect control. It is my personal opinion that the game population in most of Raleigh exceeds that of the surrounding area.

Rod Amundson, Chief
Division of Education

W. C. Hatcher of Kinston sent this in some time ago, and the hand-printed words "OR EATEN!" make good sense.

"And right over there, son, used to be one great big briar patch."

Johnston County

• continued from page 15

population in this county. Officials of the Wildlife Resources Commission gave the Johnston County Club a go-ahead on the project after the officials determined that this county has an excellent survival habitat for deer. To date, 78 deer have been released in the Hackney area.

The channelization issue may illustrate best the reason for the Wildlife Club's existence. The project calls for the clearing and dredging of 18.7 miles of creek bottom in the southeastern part of the county. Crop damage due to flooding would be reduced by the project. At the same time, the natural stream would be transformed into a clay-banked canal.

The Wildlife Club held a public forum a year ago on the issue. Proponents and opponents of the project were invited to speak. A few days after that meeting, a group of over 50 Johnstonians who own land on the two creeks drew up and signed a petition opposing the project.

Several months later, the members of the Wildlife Club voted unanimously to go on record in opposition to the project. Since then several civic groups in the area have followed suit. The chances of the project becoming a reality have been lessened considerably since that forum.

The May 26 observance marked the first time the Johnston County Club has been honored nationally, but receiving awards

is nothing new for the club. The local Wildlife Club received the Governor's Award as the "Conservation Organization of the Year" in 1969 and was runner-up for the same award this past year.

Ed Boyette III of Smithfield was chairman of the anniversary program. He introduced Mr. Patton to the Wildlife Club members and guests. Other club members taking part in the program included: Colonel Wayland Jones, Jr., president of the club, who made the welcoming remarks and recognized the committee chairmen; Dr. John Booker, who recognized the past presidents; Macy Hoyle, who recognized other special guests; Harvey Casey, who introduced Miss Barber; and J. T. Stallings, who gave the invocation. ⬍⬍

PLANT LAWS (continued from page 18)

laws seem to pivot. The whole of the Outer Banks island system, except Ocracoke (Hyde county) is either unprotected by these laws, or the laws applicable to these areas are in direct contradiction. At best, only small portions of these islands receive inferred coverage under section 14-129.

It is imperative that state laws which govern the protection of rare plant species, or any species, be maintained as applicable throughout the state as is reasonably possible. County exemptions from these laws can not be acceptable. Contradictions in the laws must be cleared.

The last section of these plant-protection laws deals specifically with Venus's Fly Trap. There are two portions of this section which make it essentially worthless. The phrase "for purposes of scientific experimentation or study" can be used to cover a multitude of sins and is so used without written permission from the Department of Conservation and Development. It is common knowledge that mass collections of this species are still made for purposes of sale or barter. If the law is followed to the letter, cultivation "domestically under controlled conditions" may mean no more than the placement of wild stock in a greenhouse for one day, after which sale of such stock can legally be made.

In many cases, protection for rare and/or unique species can not be afforded by allowing destruction of these plants on a written-permission basis. A careful analysis of the needs of the collector must be made by the proper authority.

Construction operations, particularly those for road and development purposes, are responsible for a major portion of the destruction wrought on wild plants. Other operations such as ditching and drainage, mining, careless timbering practices are responsible, as well. These like urban and industrial effluents do not stop at political, personal ownership, or any other imaginary boundaries. Several laws such as one of the burning laws of this state (General Statute 14-139) have legal domain over any citizen's property when a decided hazard from an act on his property endangers the property of an adjacent owner.

The laws for protection of rare and/or unusual plant species in the state of North Carolina are out of date and should be brought up to par with our present state of knowledge, and should further reflect a sincere commitment to the task of environmental improvement, as well as protection.

REFERENCE CITED
Radford, A. E., H. E. Ahles, and C. R. Bell. 1968. Manual of the Vascular Flora of the Carolinas. University of North Carolina Press. Chapel Hill. 1183 pp.

THE SKIPPER (continued from page 19)

per can usually educate his guests without embarrassment about these and many other things not mentioned. As an example of preventive medicine, I make it very clear that there is a bait cutting board aboard, come time to slice the shrimp or squid.

Occasionally that which blemishes the shine will fall into a category of slightly unusual. Earlier this summer a king mackerel slipped from a gaff and slid across my vinyl-covered cockpit floor. The toothy critter took a piece of my vinyl as he slid. However, a little searching behind some paneling revealed excess material which was used to work in a barely detectable patch.

I indicated some good things may have happened to your rig. Here, I was thinking that hopefully you have worked out the "bugs." Perhaps a trip or two back to the dealer for adjustments and the addition of a particular piece of equipment has the rig just like you wanted it. Of prime importance, by now you have forgotten to know your boat, how it reacts in certain weather, docking, best gas-saving cruise speed, etc. If you don't, take time and really get to know your boat.

And so it goes; if you are careful and lucky, your rig can stay in "new" condition for years. With just a little effort, a few tools and supplies, you can keep the boat so new and inviting looking you will find yourself talking to it, like: "Why are you and I in this garage and not out on the water?"

New Boating Access Area

A new Wildlife Commission free-use boating access area has been completed at Morehead City. The area is on the City Park site located just off Hwy. 70 entering the city from the west. Improvements include a 30-foot wide concrete ramp. Waters immediately adjacent to the ramp have been deepened and ample parking is available. Picnicking facilities are available on the Park proper, operated by the city. ⬍⬍

PHOTO BY TED DOSSETT

Shame On Us

This Wake County construction scene is repeated time after time throughout our state. This, and worse, ruins countless acres of wildlife habitat directly and burdens streams with silt. What are we going to do about it?

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PHOTO BY BRUCE M. TWISS

Last Chance

As cool weather comes to the Appalachian Trail, your last chance of the year to enjoy this solitude is fast approaching. But if you can't make it now, there's always next spring . . . isn't there?

STATE OF NORTH CAROLINA

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GOVERNOR

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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VOL. XXXV NO. 9 SEPTEMBER, 1971

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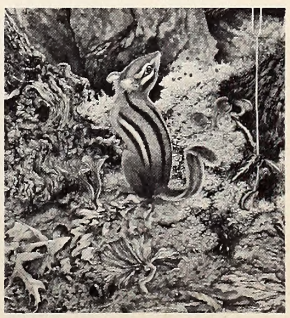


The lazy days of early fall drift into winter preparation time for Nature's wise creatures. The chipmunk, without realizing it, is even now preparing his body for a long winter's nap. But there is still time to enjoy the pleasures of summer mingled with those of autumn. September is the short corridor through which we wander from summer to colorful fall. Painting by Sallie Middleton, Asheville.

Joyce Kilmer Memorial Forest

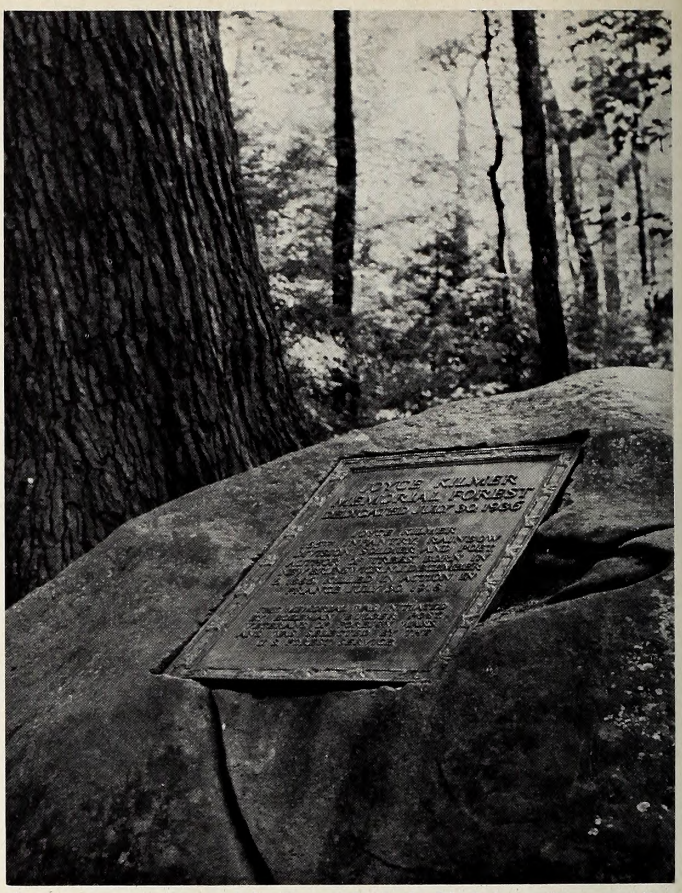
by Mrs. Mary P. Stephenson
Chapel Hill
PHOTOS BY JACK DERMID

THERE is a corner of our state where tall oaks and towering hemlocks stand in grandeur, sharing the beauty of an uncut forest with yellow poplars, sycamores and beech. This forest is a memorial, a living tribute to soldier-poet Joyce Kilmer's memory. Here, these forest sentinels of one of the last tracts of virgin hardwood are left in wilderness almost unchanged since the time of Cherokee hunting parties. The Joyce Kilmer Memorial Forest is some 15 miles northwest of Robbinsville, North Carolina, in the land of Cheoah and Unicoi Mountains near Lake Santeetlah.

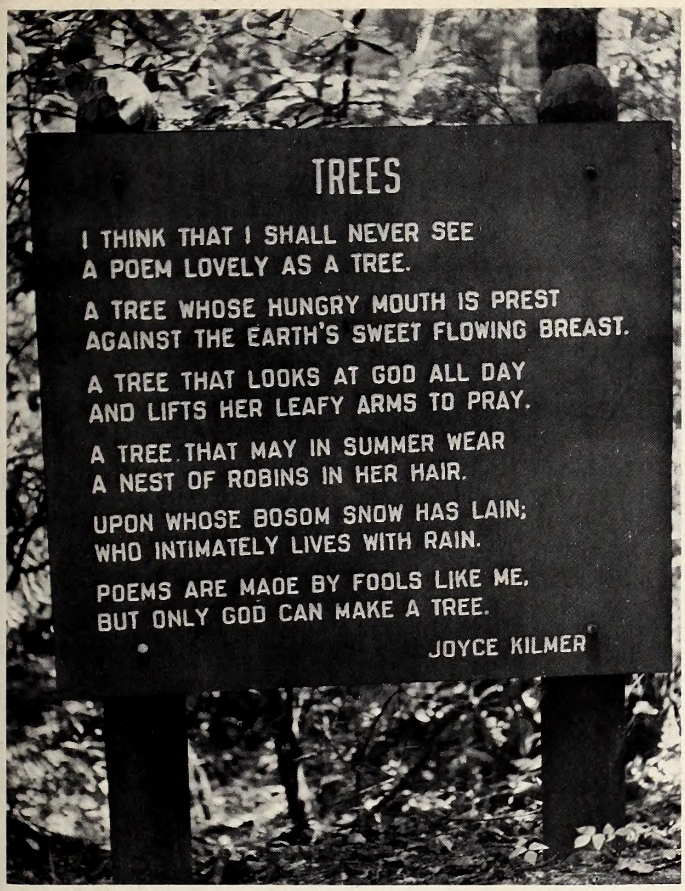
Thirty-eight hundred acres of deep groves, rushing streams and mountain ridges were selected and set aside to be maintained by the U. S. Forest Service in natural primitive state. The forest forms almost a natural basin, cut in half by Little Santeetlah Creek; from the valley of Big Poplar Grove, the forest walls rise 3,000 feet to the narrow ridges and balds. Up the middle of the basin and on each ridge are trails carefully cut by the Civilian Conservation Corps. Here too, high atop Haoe Overlook they built a now derelict and leveled fire tower, hauling cookstoves, cots and materials up from the valley below. The Corps built over 20 miles of trails; an easy graded path wanders through Big Poplar Grove, crossing Little Santeetlah Creek on several rustic wooden footbridges, but on the ridges, the trails are steep, rough in spots, but pure springs make up for the climbing by refreshing the hiker on his way to Haoe, Naked Ground and Stratton Bald.

It's a long way up, but the glory of the full-circle view into the Great Smokies, the Nantahalas, and other mountains of Tennessee and North Carolina is worth the trip. Naked Ground is a gap in the high ridge where a grassy spot here and there reminds the hiker of the times when Indians and early settlers drove their livestock through. Now, wild boar root among the birches that have grown up since the passing of the droves of animals.

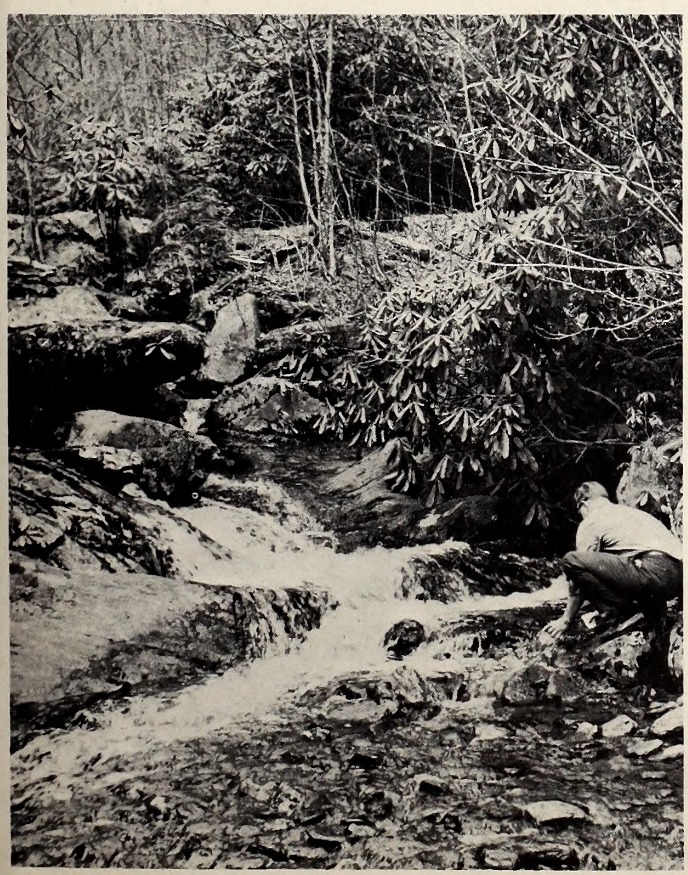
There are wild creatures in the forest, shy, wary, occasionally seen, for this is a refuge and sanctuary; surrounding the forest are Game Lands for hunting in the Nantahala National Forest. Deer, boar, fox, smaller mammals are here and bear, not the moochers of the Great Smoky Mountains National Park; these are wild bear and you may never see them on the trails, but you'll see fresh tracks,



A permanent memorial plaque is imbedded in a huge native boulder beneath one of the many towering trees. It marks the dedication of the forest on July 30, 1939. This forest is one of the few with tracts of untouched stands of yellow poplar, oak, and conifers. Isn't it worth keeping "as is?"



This poem embodies Kilmer's love for the things of Nature, and his fascination with growing things around him. The forest is truly a fitting memorial to the soldier-poet. Clean waters sparkle in the forest and care should be taken to maintain their high quality for all time.



What is ahead for Joyce Kilmer Memorial Forest? How will proposed additional roads affect it? What is our responsibility in maintaining it as Nature intended?

bear droppings, clumps of thick black hair and you'll note how the trail signs have been edged with wire and studded with nails to keep the bruins from enjoyably chewing them. Grouse, wild turkey, hawks and innumerable songbirds are found and there is special license trout fishing in Little Santeetlah Creek.

Living Memorial

On October 24th, 1970, in the quiet majesty of Kilmer's Big Grove, some 80 people honored this great living memorial. It was a cheerless day, damp, cold and overcast and those who gathered at the forest were gravely worried about its future. This late October day brought people from all over the southwest . . . the Carolinas, Georgia, Florida and Tennessee; some walked seven miles from Big Cat Gap down the ridges to the forest. Singing "We've been walking through Joyce Kilmer all the live long day, we've been walking through Joyce Kilmer just to keep the road away.", they joined others at the shelter in the visitors' parking lot. The road? That's the Federal Highway Administration's project . . . a highway from Robbinsville, North Carolina to Tellico Plains, Tennessee.

Representatives from conservation and outdoor groups of the southeast listened as Ted Snyder, chairman of the Sierra Club's new Joseph LeConte Chapter of the Carolinas, spoke while a memorial wreath was laid at the giant boulder commemorating Joyce Kilmer. He showed how the Memorial Forest and the Slickrock Creek basin form a natural wild area sharing the watershed of Haoe Lead. No matter which side of this ridge the proposed road follows, it will cut off the two areas from each other, contributing damages to each watershed.

Carl Reiche, a resident of Coral Gables, Florida, said he'd been walking in the forest for years and asked people present to help bring the problem of Kilmer Forest before national and elected officials. After listening to the speakers, small groups scattered to walk among the giant trees, to stare silently at the tops of poplars crowned in the changing color of their leaves. To see not one tree almost 20' in diameter, but twins, two poplars growing side by side . . . to stand under an immense hemlock and hear the whispered ripple of a tiny branch . . . to mark the patterned growth of lichen and moss

upon a head-high boulder . . . these are the unforgettable memories of Joyce Kilmer Memorial Forest.

Why is the memorial here? In 1934 the Veterans of Foreign Wars petitioned the U.S. Government to select an outstanding tract of forest beauty that could be set aside and dedicated as a memorial honoring the young poet-writer, Joyce Kilmer. The author of the famous poem, "Trees" had died in a First World War battle on the fields of France. This 3,800 acre forest site was chosen and approved by the Secretary of Agriculture over all other National Forests and Parks in the eastern United States as the one best suited for Kilmer's memorial. Two days before the actual dedication in 1936, a 15 minute radio broadcast about Kilmer and the forest was heard over NBC that included a special music adaptation of the poem, "Trees".

Who was Joyce Kilmer? He was an American poet and essayist with a love of nature identifiable with the Irish poets who influenced his writing. While at Rutgers he wrote "Trees", said to be in honor of a white oak tree long since removed from the New Jersey campus. He wrote for the New York *Times*, but left to enlist as a private in the 7th Regiment of the New York National Guard and was later transferred to the 165th Regiment of the Rainbow Division. He fell in battle in France and was posthumously awarded the Croix de Guerre.

On July 31st, 1936, the Raleigh *News and Observer* reported that "veterans of the war and veterans of the forest service gathered in the shadows of the finest stand of trees in Eastern America to dedicate a virgin forest as a living memorial." Speakers at the ceremony included Kilmer's comrades of the Rainbow Division and cosponsoring representatives from the Bozeman Bulger post o fthe Veterans of Foreign Wars, New Jersey, and the U.S. Forest Service. President Roosevelt sent a personal message entitled "This Living Monument" stating that "one of nature's masterpieces is set aside to be preserved for the enjoyment of generations yet unborn." Joseph C. Kircher, Regional Forester, addressed the ceremony, saying, "it is a tribute to the trees of the South that the poplars and oaks growing along the shores of Lake Santeetlah in the Blue Ridge Mountains of North Carolina have been chosen as symbols to keep green the memory of Joyce Kilmer." And he continued, "to every member of the U.S. Forest Service this area will be a sacred charge which fire and disease shall not ravage if it can be prevented. Here young trees will press their hungry mouths against the earth and lift their leafy arms to God undisturbed by man. Birds, animals, and wildflowers will reign supreme."

What Next?

But will they? Will the sanctuary that is Joyce Kilmer Memorial Forest be able to withstand the onslaughts of bulldozer and tractor tearing and scarring the watershed that surrounds it, leveling off the high ridges so that motorists may have another highway?

Since 1964, plans and alternative plans have been recommended for this roadway. What are the alternatives and what will they mean to the Joyce Kilmer Forest? Approximately 20 miles of road have been paved or graded from Robbinsville to Santeetlah Gap just past the entrance to the forest. If the road goes up on the ridges above the forest, it will do so at great cost in excavation and fill. The ridge dividing Kilmer and Slickrock is too narrow for a road 42 feet wide, and a road topping this ridge violates the Memorial Forest boundaries.

To place a road on the north side of the ridge on the Slickrock side would be even more devastating to the natural area; slopes here run to 80 percent grade. A road here would restrict and perhaps eliminate chances for obtaining wilderness area status for the Slickrock basin. But the Forest Service has announced rerouting in this manner, a very short distance from the Kilmer boundary line, on the cold north side of the ridge where original building and continual maintenance will be most costly.

These narrow ridges don't have to bear a road at all. Indeed there's an existing Forest Service road along the Santeetlah Creek watershed up to Beech Gap; a road that could be easily developed and utilized to carry commercial traffic as well as scenic drives completely outside the forest.

Final roadbuilding decisions will be influenced by the outcome of two studies this spring. As required by the National Environmental Protection Act of 1969, the Forest Service is preparing a statement on the environmental impact of this proposed road. A study team, led by Dr. Keith Argow, District Ranger for the Jefferson National Forest in Virginia and recently with North Carolina State University will report on all potential route locations, though the main consideration of the team will be the route on the north side of the ridge. In addition, a special team will go into Slickrock Creek basin to determine if a full scale wilderness study should be made of this area.

There may well be need for improved roads in this part of western North Carolina and eastern Tennessee, but presently there are several fine scenic roads in the Nantahalas . . . the Wayah Crest Road, the Nantahala Gorge, and Highway 129 from Topton to Tapoco. Proponents and opponents of the road would do well to consider that Kilmer Forest is unique, untouched by man except at its outer edges, and one of the very, very last areas of wild country left in the east. There just aren't any more left. Maybe the road wouldn't despoil this last sanctuary for tree and bird, but can we afford to take the chance? Does man have the right to take all the land for his own desires and leave nothing that is wild and free? The trees of Joyce Kilmer cannot speak for themselves; it is left to mankind to accept his place on earth, partner of all living things, not plunderer. ⬍⬍

PHOTO BY JOEL ARRINGTON

Among Life's Extras

by Josephine M. Upchurch
Raleigh

DEEP into the heart of Wake County there is a pond with white sandy beach in a setting of wild flowers and hardwoods. Hundreds of people have visited this place down through the years, and they refer to it affectionately as Truby's Place. The unique characteristic of this sculpturesque landscape is that it has a built-in symphony.

On an unusually warm evening last summer, Mr. Truby was sitting under the picnic shelter and about nine o'clock a strange musical performance broke the silence. A colony of barking tree frogs resounded in a mellowed chorus. Apparently these frogs had just migrated to this hideaway, for they had not been heard in this particular setting previously. These little creatures are found primarily around bodies of water in pine forests, such as barrow pits, and in cypress swamp areas. Their primary range in North Carolina is New Hanover and Brunswick counties.

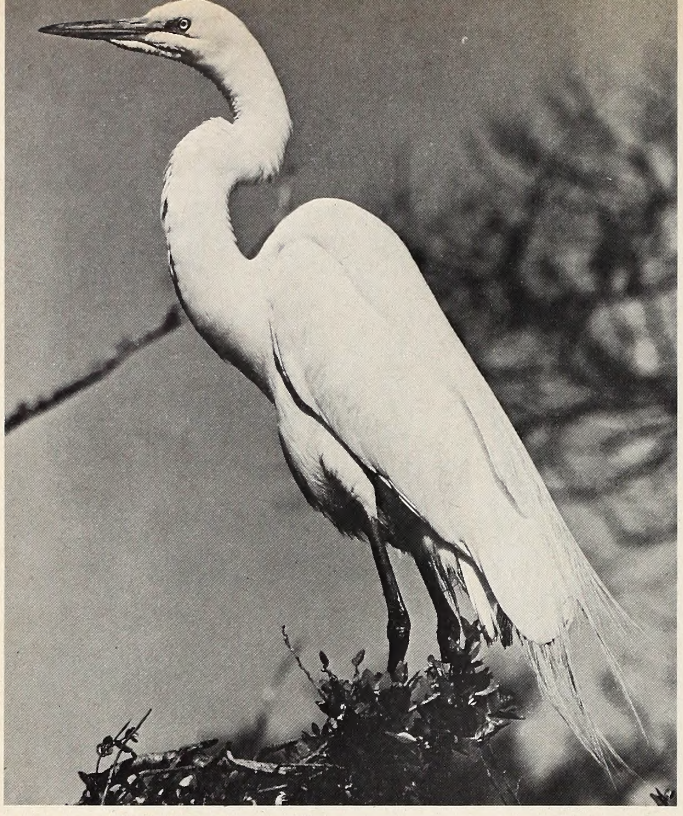
The barking tree frog looks like a toad with a smooth skin, and he has no "warts." The general coloration may vary from tan to a greenish color and may include tones of pink or reddish brown. The young frog is more often greenish with a fawn-colored band across the middle of his back. These frogs most frequently make limestone caves and ledges their home and rarely venture out into the open, even during rains. Prior to last summer, the only record for the barking tree frog in Wake County was a "dead on the road" specimen collected near Lake Benson. This fact leads us to wonder whether the colony of these frogs at Truby's Place is lost en route, or just how did they happen to adopt this setting for their home. Perhaps the silence and the undisturbed natural state endeared them to the landscape, or could be these little creatures are becoming more adventurous.

Truby's frogs not only venture into the rain, they swim in the pond and allow themselves to be captured by curious humans; but when they are, they puff up prodigiously. When the female is grasped in one's hand she makes a blaring screech. As can be seen in the picture, the barking tree frog has a very large forearm and a lateral fold. In size these frogs range from two and one-half inches to three inches long. The record is three and three-fourths inches.

The frogs had a quiet winter, but they came out for their summer performances. Seemingly, they are at their best on very warm evenings while dusk is gently absorbed by darkness. The older frogs are in strong voice with an explosive call like the bark of a dog at a distance, but a more guttural **whurr** at close range. The chorus begins with a resounding whur-whurr-rr-rrr and the note is repeated at regular intervals of two to three seconds until the performance is over. The baby frogs must learn from their elders, and sometimes they are off-key and their timing is not right.

Mr. Truby has been fascinated by the first attempt of a baby frog to chime in, his discouragement, and his growth to a place in his own right in the chorus. With a bit of "other worldness" in his eyes, he relates that the mixed chorus of whur-whurr-rr-rrr in late evening in this setting of unspoiled Nature is a refreshing moment which gives one pause. The Barking Tree Frog Symphony is one of life's extras which has to be heard to be aptly appreciated.

In Nature's vast scheme of things, there are creatures whose purpose may be obscure, but none-the-less worthy. So, what is the purpose of this little creature? If a purpose must be declared, then the barking tree frog is a fragment of creation—created simply to be. We hope that you agree. ⬍⬍



AMERICAN EGRET PHOTO BY JOEL ARRINGTON

The Economic Value of Birds

by Charlotte Hilton Green
Raleigh

God, when you patterned a bird's song,
Flung on a silver string,
How did you know the ecstasy
That crystal call would bring?
How did you think of a bubbling throat
And a darling speckled wing?

Unknown

SONG, beauty of plumage, grace of flight and motion, the awe and mystery of migration—all these birds bring us, as is constantly being pointed out by scientists and ornithologists, as well as by poets, artists, and the ever-increasing "bird watcher" who rates high their human interest and emotional and recreational value.

Birds have long been a source of inspiration for popular motifs in art, music, literature, the dance. Their colors, form and flight have tempted the artist since he first tried to portray them in his cave-man days. In ancient civilizations birds were symbolic, often raised to ranks of deity.

They have helped man for thousands of years, aeons before those geese whose warning cries saved Rome from the Gauls, down to the canaries long used to warn coal miners of methane gas leakage. Pigeons, and others, were used as messengers

The value of birds goes far beyond the "economic," but if we were to place a dollar price tag on them, it would far exceed that which most of us think.

from the time of Noah; Caesar used them to send news of victories . . . they were used in World War I and some in World War II, until finally electronics largely supplanted their services.

But birds mean much more to us. Their economic value to mankind: to his harvests, his forests, his table, his sanitation—and often his morale. They serve as "winged policemen" in numerous ways; as carrion cleaners the "white-wings" of the beach and harbor (gulls and others) help make our good *Earth* a cleaner, healthier, more efficient abode for man, as do the vultures.

According to scientists they do far more than that. Birds help make life on our green earth possible. Even the most hard-boiled must admit that if every bird were suddenly wiped off the face of the earth, within seven years or so life itself would be almost impossible. "For, in the ultimate, life depends on 'green things a-growing' and birds play an important role therein." This is no "sentimental twaddle of aging birdlovers;" it is a conclusion after decades of observation and study by scientists and biologists, in field and laboratory, not only from tediously watching what birds eat, but also from drastic, persevering, analytical study of the contents of their stomachs.

Dr. Frank M. Chapman, America's Dean of Birdmen, whose *HANDBOOK OF BIRDS OF EASTERN NORTH AMERICA,* was the "Bird Bible" of the older generation of bird students, around the turn of the century, and long after, did much to start America not only *thinking* about birds and recognizing their *economic* value, but also about *protecting* them. (Because of persistent, continuous demand, another edition of this book was recently brought out.)

"Birds," he stated, "occupy a four-fold relation to man: economic, aesthetic, symbolic, scientific. They are nature's most potent checks upon undue increase of noxious insects and harmful rodents; devour seeds of weeds and act as scavengers. The more we learn of their food habits, the more we recognize our indebtedness to them. Without their services, the ravages of animals and insects they prey upon would make life upon our globe impossible.

How necessary are the predators, especially those birds of prey that were once ruthlessly, and thoughtlessly, shot at sight? "A pair of field mice are capable of producing a million descendants in one year. At this rate of production they would soon overrun the earth if it were not for such limiting factors as disease, food shortage, and particularly depredation by carnivorous animals. In brief, the predator's function in nature is to maintain a limit on the species that feed upon plants and grain.*

*Useful Birds and Their Protection. E. H. Forbush

PHOTO BY WALTER VESS, JR.

The birds of prey, the predators, are immeasurably valuable in controlling various rodents. Even the little sparrow hawk, although he rarely tackles sparrows, does his bit by consuming quantities of insects, particularly grasshoppers. All of these birds are protected by law.

Birds of prey, it has been pointed out: "Divide all nature into two parts: day and night. Two-thirds of them—the hawks, eagles, falcons, kites, vultures—are diurnal, busily active between sunrise and sunset. The other third, the owls, are mainly night hunters."

The number of small rodents eaten by these winged predators is almost as remarkable, in proportion to their size, as is the number of insects taken by smaller birds. In the early days economic-minded ornithologists and biologists fighting for bird protection in an era when "anything in feathers" was a target for anyone's gun, there were purposely many studies by the old Biological Survey, of the contents of birds' stomachs.

One such study was of a pair of barn owls which had long occupied the old Smithsonian Building in Washington, D. C. Dr. R. K. Fisher had found the floor strewn with their pellets. (Owls regurgitate the indigestible portions, as skulls, teeth, feathers, fur, in the form of pellets.)

Examination of two hundreds of the pellets (there were many more) showed a total of 545 skulls of various species of mice, rats, moles, shrews, and *one vesper* sparrow.* (Remember, the young of hawks, eagles, owls remain a long time in nest, thus requiring a vast amount of food.)

Granted, a few species of these predators, as the sharp-shinned hawk, Cooper's and the duck hawk (now generally known as the peregrine falcon) do feed largely on small birds, but usually they are the weak, the diseased, the crippled, the less alert. It all means the survival of the fittest, which is important in nature.

The 25 families of most perching birds found in North America are more or less insectivorous, with the exception of the lark and sparrow families, that live primarily upon seeds, except during the breeding season. (Granted, many of the insectivorous birds, among the flycatchers, tanagers, thrushes, waxwings, etc. are fond of fruits, but the damage they do is infinitesimal compared to the good they do.)

Too, we must recognize some of these birds as tree planters—feeding on the berries of fruits of cedars, hollies, dogwoods, wild cherries, and such, they often scatter them far and wide, as the hard core of such pass through their digestive tracts unharmed.

A few, as the hummingbird, some of the small warblers, also serve as pollinators.

In similar insect surveys of birds' stomachs we will note but a few cases: "500 mosquitoes in a night hawk's; in another's, 60 grasshoppers; in a yellow-billed cuckoo's were 217 fall web-worms, and in yet another cuckoo's were 250 caterpillars." (Both nighthawks and cuckoos are in the entire state from April into October.) "Two flickers' stomachs yielded 3,000 and 5,000 ants respectively, and a mourning dove's, 9,000 weed seeds."

The tale of the "Gull Monument" in Salt Lake City is fairly well known. Back in the early days black crickets were destroying the crops when gulls (probably the Franklin, an inland gull seldom seen on either coast) appeared by thousands, cleared the fields of insects, and saved the crops. In 1913 the Mormons, a devoutly religious people, feeling their coming was an act of divine providence, erected the now famous Gull Monument.

Historically, there are many authentic cases of gulls having saved various crops from infestations. (In Sweden gulls also feed on lemmings during their spectacular, mysterious and devastating migrations to the sea.)

Similar services were performed by birds during the great locust ravages which followed settlement of the Mississippi Valley, "When large swarms of locusts appeared nearly all birds, from the smallest to the great whooping crane, fed on them. Again, this was verified by scientific study, not only of their feeding habits, but of their stomach contents."*

Here, looking out from my Study eyrie among the treetops, I can detect movement among the leaves near the top of the big oak. I reach for the binoculars (always near-by) . . . yes, it is a red-eyed vireo. Throughout the whole state in summer it is a common resident, yet not too well known, even though its repetitive notes (it's been called "the preacher bird"), are often repeated. Searching for insects under the leaves, they are not easy to discern.

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*E. H. Forbush *Useful Birds and Their Protection*

I recall the tale—and stop to verify it—by E. H. Forbush, Ornithologist with Massachusetts State Board of Agriculture—back in the days when such men were fighting valiantly *to prove* that birds' economic value deserved their protection. In one such all-day study a biologist had been watching a pair of red-eyed vireos feeding their three day-old youngsters, both parents participating. They came to the nest with food 120 times in ten hours, with feeding periods less than six minutes apart. (And that left four more "day-light hours" unwatched, so unaccounted for.) Vireos, and many of the warblers, are usually constant, but too often unseen, gleaners, scrutinizing the foliage.

In *The BOOK of BIRD LIFE* by Dr. Arthur A. Allen, one of the founders of the famed Sapsucker Laboratory of Ornithology connected with Cornell University, Ithaca, N. Y.—and one of the pioneers in recording bird songs—(he gave the first Bird Lecture in Raleigh, at State College) states: "Little hope would there be for mankind were it not for the natural enemies of insects, chief among them are the birds. From the grubs that burrow in the soil and cut off the roots of plants to the moths that flutter above the treetops, there are thousands of different kinds of insects insidiously working and threatening to destroy the grass at our feet, the plants in our gardens, the crops in the fields, the fruit trees in the orchard, the very forests themselves.

"But for each type of insect nature has developed corresponding types of birds to feed upon them, and keep them in bounds . . ."

A different situation gradually entered the picture, as Rachel Carson so ably depicts in *Silent Spring*—(by now well known, from its vituperation to its later vindication, so clearly acknowledged in numerous articles, magazines, and especially in Frank Graham, Jr.'s *Since Silent Spring.*)

The picture of agriculture has been changing . . . many farmlands of today are highly artificial, unlike anything nature ever conceived. Immense fields of one crop, especially in the midwest—and there, and in New England whole cities had been planted to the beautiful, graceful elm—and now are dying because of concentration of a particular enemy, the so-called Dutch Elm disease (brought from Europe around 1930 in elm burl logs imported for the veneer industry—and apparently bypassed by careless immigration inspection.)

For a time everywhere authorities went overboard on DDT spraying. Intensive spraying became a routine procedure . . . at first not understood was the tragic story of overall DDT spraying and its cycle . . . "We spray our elms and the following springs are silent of robin song, not because we sprayed the robins directly but because the poison traveled, step by step, through the now familiar elm leaf-earth-worm-robin cycle. These are matters of record around us. They reflect the web of life—or death—that scientists know as ecology."*

**Silent Spring* Rachel Carson

The fire-ant? "The U.S. Department of Plant Pest Control in cooperation with some afflicted states would ultimately treat some 20,000,000 acres in nine southern states—the chemicals to be used *dieldrin* and *heptachlor*, both relatively new—and both *more toxic* than DDT."

The studies revealed too much destruction of wildlife. "Some of the most upsetting news for southern sportsmen concerned the bobwhite quail. This bird, a ground feeder and forager, was all but eliminated in treated areas. In Alabama biologists of the Alabama Cooperative Wildlife Research Unit conducted a preliminary census of the quail population in a 3600-acre area that was scheduled for treatment. Thirteen resident coveys—121 quail—ranged over the area. Two weeks after treatment only dead quail could be found. All specimens sent to the Fish and Wildlife Service for analysis were found to contain insecticides in amounts sufficient to cause their death . . . In addition to quail, wild turkeys were seriously reduced by the fire ant program."

"Will we, or can we, return to some biological control (as some of the European forests are doing) where birds, ants, forest spiders and soil bacteria are considered—and the encouragement of birds is one of the first steps?"

"One Bird From 500 Nests"

As this is being completed, the June-July *National Wildlife* comes, with a long, illustrated article on

Of the many birds in danger of extermination, the pelican is apparently in a period of rapid decline. It might be difficult to assign values to the pelican, but its passing indicates a damaged environment.

PHOTO BY JACK DERMID

the brown pelican. "DDT has doomed countless nesting colonies of it in the U.S.; now only 24 remain . . . In 1970, only one young pelican fledged from 500 nests on Anacapa Island. Only one chick in all of California . . . Last summer only 24 successful nesting colonies were known in the U.S.; two in South Carolina and 22 in Florida . . . DDT and other pesticides accumulate enough DDT in their bodies to disrupt the normal metabolism of calcium carbonate resulting in a thin-shelled egg. When the thinning reaches a certain level, the shells are broken by the adult pelicans when they begin to incubate." (Irony: the brown pelican is State Bird of Louisiana!)

But, in the past, there was also a dearth of certain birds building up, too. And from a different cause. Let us look back in history a bit—even to far-away, Ekaterinburg, Siberia. (Where the last Russian czar and his entire family were murdered.) This was even previous to that. There had been a famine, produced by the ravages of two species of cutworms and some ten species of locusts, together with want of rain, *plus the almost complete destruction of birds!* Most of them had been killed and *sent abroad by wagonloads for ladies' hats!*

Ah, ladies, what price vanity! What crimes committed because of women's fashions! And therein is a true, tragic, and disgraceful tale of our own history. We've all heard, time after time, of almost fatal extinction of the beautiful egrets, because of the demand for their "aigrettes" those fragile, airy white plumes, that fashion demanded—and so ladies wore them—on their elaborate hair-do's and on the immense hats that were the vogue.

Ah, yes, unfortunately there *was an economic value* (for the wrong purpose) of certain birds in those days! Not only for the aigrettes and other feathers, but sometimes the *whole bird*—hummingbirds, bluebirds, scarlet tanagers, the Baltimore oriole, adorned Milady's chapeau. Around the turn of the century there was the society fashion note of "a stunning hat, with hummingbirds all over the crown and around the wide brim."

Another favorite, the fairy-like least tern, was almost exterminated by the millinery trade. At balls women even adorned their immense pomadours with the mounted bird, wings outspread! (According to *Birds of North Carolina*: "The rebuilding of the population of the least tern, which was on the point of vanishing in 1903, is but another example of what may sometimes be accomplished in wildlife conservation by the enactment of wise laws and the cultivation of public sentiment to support them. Today, the exquisite fairy-like creature is one of the most abundant terns that inhabit our coast.")

The number of birds killed in the United States before public sentiment, finally backed by laws (but not before some guardian wardens were killed) cannot be estimated, but a few authentic figures can be given." "A single taxidermist handled 30,000 bird skins in one year . . . in an auction room in London 400,000 bird skins from America and over 35,000 from India, were sold. One New York firm had a contract to supply 40,000 bird skins yearly to a Paris firm." The economic value of game birds (when such were allowed killed for the market) is beyond calculation. Here is one figure. In 1909—5,719,214 game birds were killed in Louisiana, where birds from the North congregate in winter.*

Also, in those long years of thoughtless and cruel exploitation, there was a mania for collecting birds' eggs—a complete set being desired. And of course, the rarer the bird, the more demand for the eggs.

And though there was also a growing demand for wild song birds for cages, this inhumane traffic was later prohibited by law.

PHOTO BY JACK DERMID

The hunting and collecting of bird eggs was once a favorite pastime. It may have contributed to species decline in some cases, and certainly is to be discouraged. The hatching rate is already very low in many birds.

FEATHERS! Considering the former exploitation by modern (?) woman for such personal adornment, one can more readily understand a more primitive people's, and savage's, delight in them. In South Africa we were guests (1955) where 5,000 tribal dancers were honoring their chieftain—men and women, dressed in anything from beads to skins, but especially feathers. Later we were taken to be presented to him—a suave gentlemen who, at his father's death, had been recalled from Yale University to look after tribal affairs!

What value feathers? In one of South America's museum's I recall seeing an Inca noble's (priceless) ceremonial robe—largely covered with iridescent hummingbird feathers. (There are, remember, some 500 species of hummingbirds found only in western hemisphere, most of them in Mexico, Central America, but mainly South America.) In the eastern states we have only one, the ruby-throat, which is becoming more and more scarce. The answer? Is it insecticides?

Yes, feathers have played an important role. In Santa Cruz Island, in the South Pacific, the scarlet feathers of a tiny honey-eater, woven into a

**The Practical Value of Birds* Junius Henderson

"money-belt" will buy a bride.* (The better condition the feathers, the prettier the bride!)

Goose feathers—the soft down plucked from the living bird (some can be plucked five times a year —and this is still done in some parts of eastern North Carolina) have long been popular for "feather beds." What bliss in a cold, northern land to burrow down in one on bitter nights!

And as for goose pens! Our ancestors used the long wing-quills of geese. How many important documents have been signed with one! How much history written with them! (It is said Charles Dickens wrote a whole book with a single quill-pen.)

A Famous Ancestor

Economically, probably the most important bird of all—the good earth over and throughout time? *A jungle fowl of the Pheasant Family.* "Of all the world's birds, none has more intimate association with man nor contributed more to his welfare than the red jungle fowl, *Gallus gallus.* From this one species of pheasant all the many varieties of domestic chickens have had their origin and today the number of individuals runs into the billions . . . Although originating in the jungles and bamboo thickets of southeastern Asia, it has penetrated to almost every corner of the world, wherever man has taken root, except in frigid climates.

"Probably more than 5,000 years ago man began domesticating them . . . they seem to have reached Central Europe as early as 1,500 B.C." (The BIRDS.)

Turkeys? The turkey is America's great contribution to animal husbandry. The Mexican race of the wild turkey had already been domesticated by the Indians when Mexico fell to Cortez. The returning Conquistadores introduced the bird to Europe and by 1530 it was quite well established there.

Ducks? Ah, ducks! Domestic ducks . . . most of them are said to be descended from the familiar, popular and handsome, green-headed, wild mallard. But far more important economically, commercially and recreationally are considered the wild ducks, en masse, as "Pursued by nearly 1.5 million American sportsmen, most of whom spend not only $3.00 yearly for the duck stamp, but considerably more for equipment, travel, lodging, etc. . . . thus economically helping a wide range of industries, services, and areas."

(This leads to the topic of legitimate hunting. While the writer, and most bird-watchers, prefer "hunting" birds with binoculars, 'scopes, field guides and note-books, we recognize the sportsman's place, in his *legitimate* hunting—and thus the important role as aids in the wildlife protection, increase, and economic value of birds.)

"American sportsmen provided over $235,000,000 last year for the protection and management of the nation's wildlife resources. (It is not possible to separate the figures for birds, alone.) But hunters and fishermen spent more than $192,000,000 for licenses, tags, permits, stamps, etc. These revenues are used by states to protect and manage all wildlife and fish resources, not just game animals." OUTDOOR NEWS BULLETIN, Wildlife Management Institute, May 14, '71.

The most valuable *wild bird* of today is considered the guanay of coastal Peru, its excrement (fine fertilizer) amounts to millions of dollars, some of the accumulations are 150 feet deep, of at least 25 centuries. In 1964, while in Peru, Harvey Baumgartner, of the NCSU, who was with the State's Agricultural Mission to Peru, took me to one of the collecting areas. Incidentally, there are so many millions of these birds that in 1610 a famous "Bridge of Stone" was constructed of stone, lime and the *whites of eggs* of the guanay birds.

A former bird "Big Business" was in ostrich plumes, mainly South Africa, but at one time, when plumes were greatly in vogue, ostrich farms were a profitable business in southwestern United States. But styles change. When I was in South Africa, at a reception the University of South Africa gave our group, a university ornithologist told me, "If ladies would only wear ostrich plumes again, it would aid our economy!" (Alas, ladies today are not even wearing hats, much less beplumed hats!)

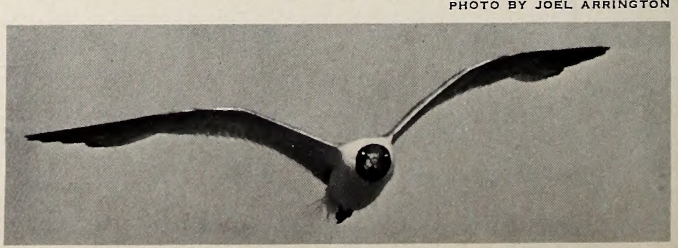
So far we have been mainly *practical* regarding birds' economic value.

But beyond any concept of values, how much have birds added to one's interest in life! As a hobby it can help liquidate ennui, boredom, heartache, loneliness. What price the emotional thrill when one hears the first honking of wild geese, the first sight of the flying wedge . . . the return of the first bird of the season to one's own bird bath and feeders, finding one's first hummingbird's nest . . . stalking an elusive and beautiful warbler, finally adding a "new bird" to one's "life list!" And "boning up" on birds of a different part of the country, or a visit to a foreign land!

Too, birds can be an "Open Sesame." With a pair of binoculars around one's neck it is usually considered proper to speak to the next person one sees so accoutered. On shipboard such folks soon become bird pals. (On a leisurely cruise through the fabulous "Inside Passage" from Seattle to Alaska, with scores of new birds strange to most of us, a bird fan who was also an expert bridge player (and constantly in demand as a needed "fourth") was always slipping away to join our small group of excited birders.)

Yes, I repeat, such an "economic value" is "beyond price." And the *practical?* I hope this article has proved it. ◆

PHOTO BY JOEL ARRINGTON



NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

The 1971-1972 hunting season gets under way half an hour before sunrise September 1 with the first shooting at marsh hens along the coastal marshes. The season on king, clapper, sora, and Virginia rails and gallinules will last through November 9.

Bag limits: king and clapper rails, 15 daily, 30 in possession; sora and Virginia rails 25 daily, 25 in possession, and gallinules 15 daily and 30 in possession. This makes a possible daily bag of 55 birds.

Doves Next

Close on the heels of the marsh hen season is the open season on doves which runs from September 4 to October 9 and December 13 to January 15. Shooting hours as usual will be from noon to sunset, but the bag limit has been reduced from 18 daily, 36 in possession, to 12 daily and 24 in possession. The reduction is part of an experiment being conducted by the U. S. Bureau of Sports Fisheries and Wildlife, and does not reflect a shortage of birds.

See elsewhere in this issue for location of public dove hunting areas.

Big Game Hunters Need Special Licenses

Hunters who plan to hunt big game—deer, bear, wild boar or wild turkeys—anywhere in North Carolina during the 1971-1972 hunting season will need a $1.75 Special Big Game License in addition to any other required licenses or permits.

These Special Big Game Licenses are required both on and off the N. C. Wildlife Resources Commission's managed Game Lands.

Hunters who plan to hunt on the Wildlife Commission's Game Lands—either for small or big game—will also need one of the new $6 season Game Lands Use Permits. Attached to the Game Lands Use Permit are big game tags. These tags DO NOT take the place of the Special Big Game Hunting License, and hunters who plan to hunt big game on the Game Lands are cautioned to be sure they have both a valid Special Big Game License ($1.75) and a valid season Game Lands Use Permit with attached big game tags ($6.00).

The tags which are furnished with the Game Lands Use Permit are designed only to help Wildlife Commission personnel check kills and more efficiently manage big game populations on Game Lands.

MUTE SWAN

September Song

WHITE-TAIL FAWN

by Wiley McKellar
Wilmington
Photos by Jan Buffkin

SEPTEMBER is the shortest season of the year.

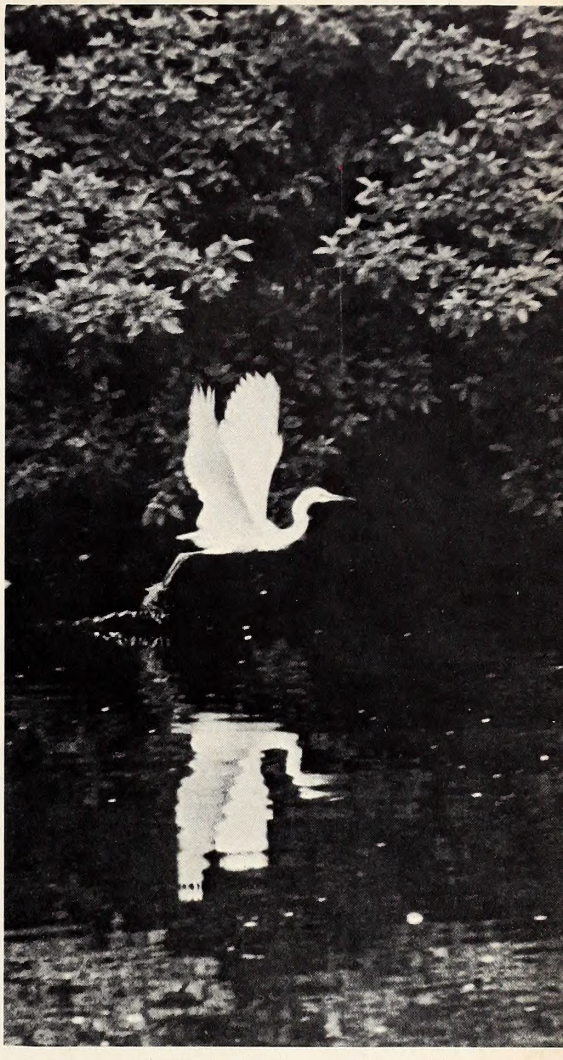
Slotted somewhere in the equinoctial largo between the splendid indolence of summer and the vigor of autumn, September asserts herself in the most subtle manner.

Her shadows lengthen slightly, and there is a certain feel in the evening air. Dawn breaks cooler and the trembling streams run with a slight chill when kissed by September.

And true to creation, somewhere deep in the labyrinthine nature of every living being, the dance of the season goes into a cadenza to signal the coming of the cooler season.

What switch is tripped to prod the egret to flight? A lone signal or a complete message notifies the bird of September's arrival, and he charts his

DEER FAMILY



SNOWY EGRET

course for the warmer clime.

Is it the same signal that stirs the squirrel? Does the twitching nose sense the necessity to set aside an extra nut?

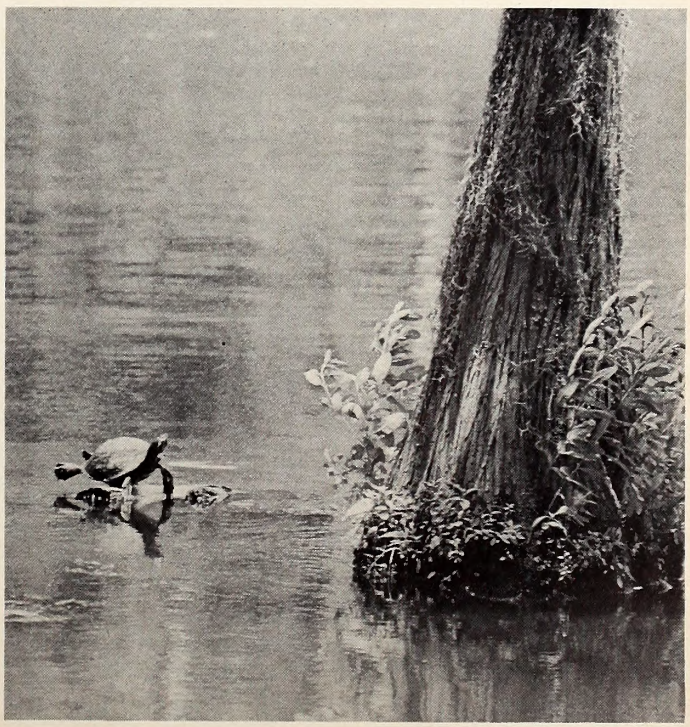
We do not yet see the tinted leaves, and the flying insects of summer are still here, but even the plants and the lower animals turn to the signal of September. Cyclical or phenomenal, there is a September effect.

It fruits the bud, it thickens the animal coat, it ripples the water, causing the turtle's splashing protest.

It is not so much the signal that things will be tough, but more that the easy season is waning.

And what of the baby things? Their first September is something new and strange. The young deer testing new impulses, he senses the September Song, but does he understand the lyric? It is new and he is young. He does not rebel and he does not whine. Somewhere in his mysterious animal wisdom is the inherent realization that his mother and his father both saw their first Septembers and as he grows older, he will become more familiar with the signal. ⬍

YELLOW-BELLIED TURTLE



Looking for Spring

by R. Reader, H. Lieth and J. Radford
University of North Carolina
Dept. of Botany

THIS report constitutes the third in our series of semi-annual papers (see also Wildlife in North Carolina, *September 1970), reporting on the progress of a phenology project of the Botany Department, University of North Carolina (Chapel Hill). The primary aim of this program is to establish a predictive relationship between seasonal changes in environmental parameters, such as temperature and day length, and the response of living organisms to these changes. Knowledge of the timing of seasonal events, such as the time of leaf initiation and flowering in plants, as well as related changes in animal activity, is necessary if we are to effectively manage our remaining natural areas.*

For the past two years we have asked interested individuals to report on the dates of first flowering of the dogwood *(Cornus florida),* redbud *(Cercis canadensis)* and red maple *(Acer rubrum)* trees in their areas. Based on their responses, we have been able to construct a map of flowering dates for these species, and we have equated the average date of flowering with the approximate arrival of spring in these areas.

The "N. C. Phenology Program" received national recognition when we presented convincing evidence in *BioScience* (Lieth and Radford, 1971), one of the nation's leading biological journals, that good scientific work can be based on the help of volunteers, if planned properly. The response has certainly been encouraging, and we hope it will continue. With about 300 observers in the state we probably have the nation's densest observer network, but we need still more volunteers for certain projects.

We would like to take this opportunity to thank each individual who provided us with flowering information for his area this spring. Several people merit special recognition, as they either sent in more than one report, or organized their own group of observers: Mr. O. Boody (Misenheimer), Western Piedmont Community College Botany Class (Morganton), Mr. J. R. Edwards (Waynesville), Mrs. D. Franck (Cranberry), Mrs. M. Hunt (Martin Technical Institution—Williamston), Mr. D. Jeffreys (Greenville), Mrs. J. E. McGaha (Brevard Senior High School), Mr. C. E. Moore, Jr. (Charlotte), Mrs. V. T. Rue (Greenville Academy), Mr. G. R. Taylor (Hubert), and Mr. Y. A. Taylor (Raleigh).

The Arrival of Spring 1971

In the spring of 1971 our volunteer observer network supplied us with a total of 305 flowering date responses, representing 77 out of 100 counties in North Carolina. This represents a 25 percent return on the approximately 1200 forms we originally sent out. Not all returns included information on all three plants. Red maple was not as widely known as we expected. The results of the red maple data are very interesting however, so that we plan to observe this tree again next spring.

The combined red maple-dogwood-redbud records were used to calculate an average flowering date for each county. These county averages were employed as data in our computer mapping routine, as described earlier (*Wildlife in North Carolina,* February 1971; *BioScience,* January 1971). The resulting map (Map 1) shows the approximate arrival of spring in 1971 at all points in North Carolina.

According to the map, spring 1971 made its first appearance in the southeastern portion of the state, around yearday 70 (March 11), progressing up the Coastal Plain during the following week. In the central regions of the state, i.e., the Piedmont, similar plant activity was not noted until between yeardays 89 and 96 (March 30 and April 6), while in western mountain regions of the state spring arrived sometime after the middle of April (between yeardays 101 and 118).

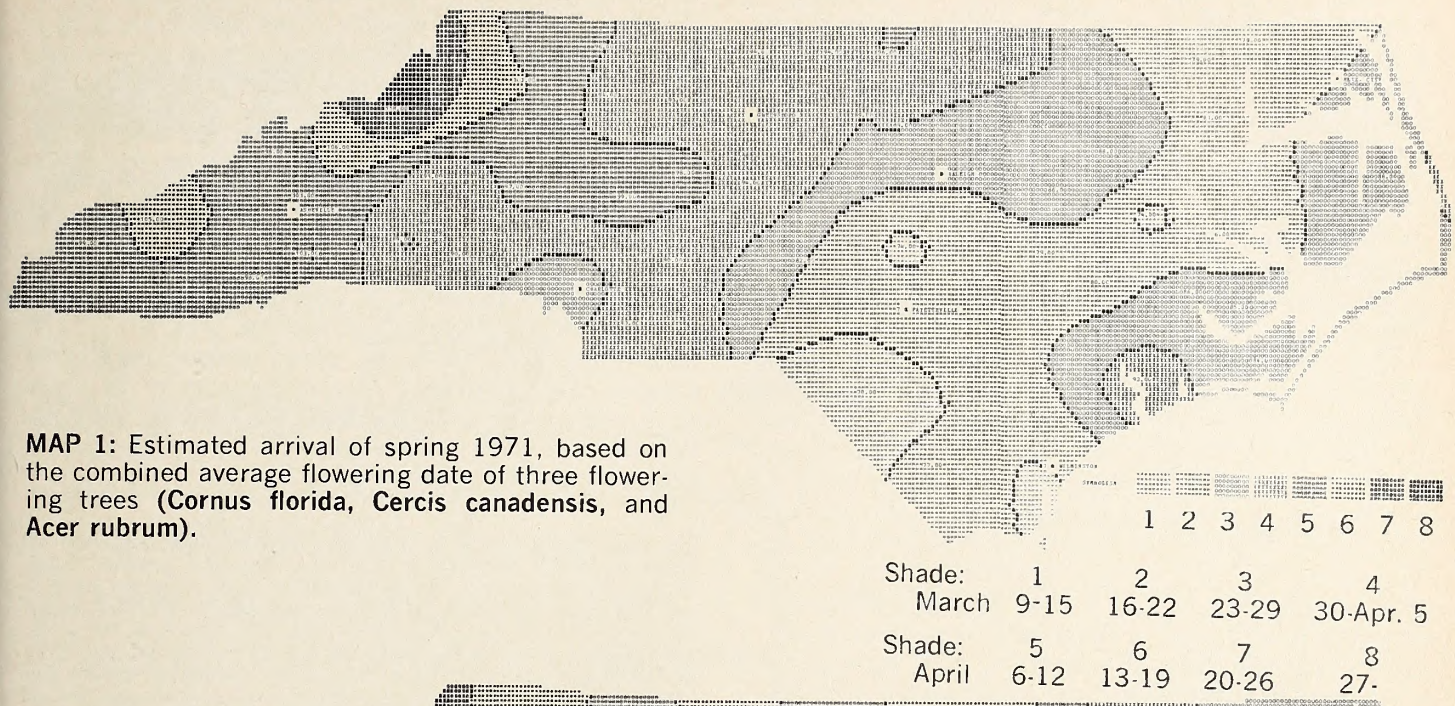
The Arrival of Spring 1970 vs 1971

The timing and pattern of the arrival of spring in North Carolina in 1971 (Map 2) was compared to the date of spring arrival in 1970 (Map 3). The comparison was based on flowering records for counties in which the flowering dates of dogwood and redbud were observed and reported in both 1970 and 1971. In two successive years spring awakening was first evident in the southeastern Coastal Plain, occurring on yearday 79 (March 20) in 1970, and on yearday 78 in 1971. However, in the northern portions of the Coastal Plain, spring flowering was up to 10 days earlier in 1971, producing phenological patterns quite different from those recorded in 1970. In the Piedmont area of central North Carolina both the pattern and timing of average redbud-dogwood flowering was similar in 1970 and 1971. In the western mountain counties we received a greater number of responses in 1971, which resulted in a slightly different, but more accurate, picture of the timing of spring flowering in this area of the state.

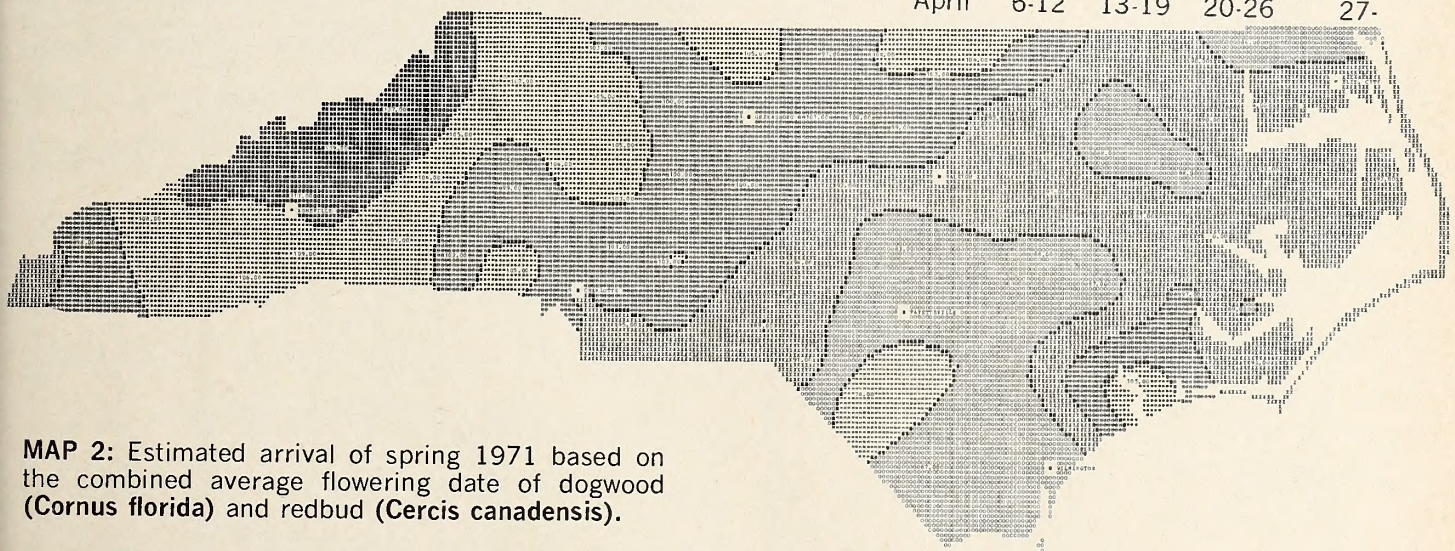
Future Mapping Plans

While a similar pattern of spring flowering has been observed in mountain and piedmont counties in two successive years, differences in coastal patterns indicate that similar observations must be made in future years. We would like to determine a five-year flowering date average for each of the species presently being considered. A flowering average based on five years' data should be reliable

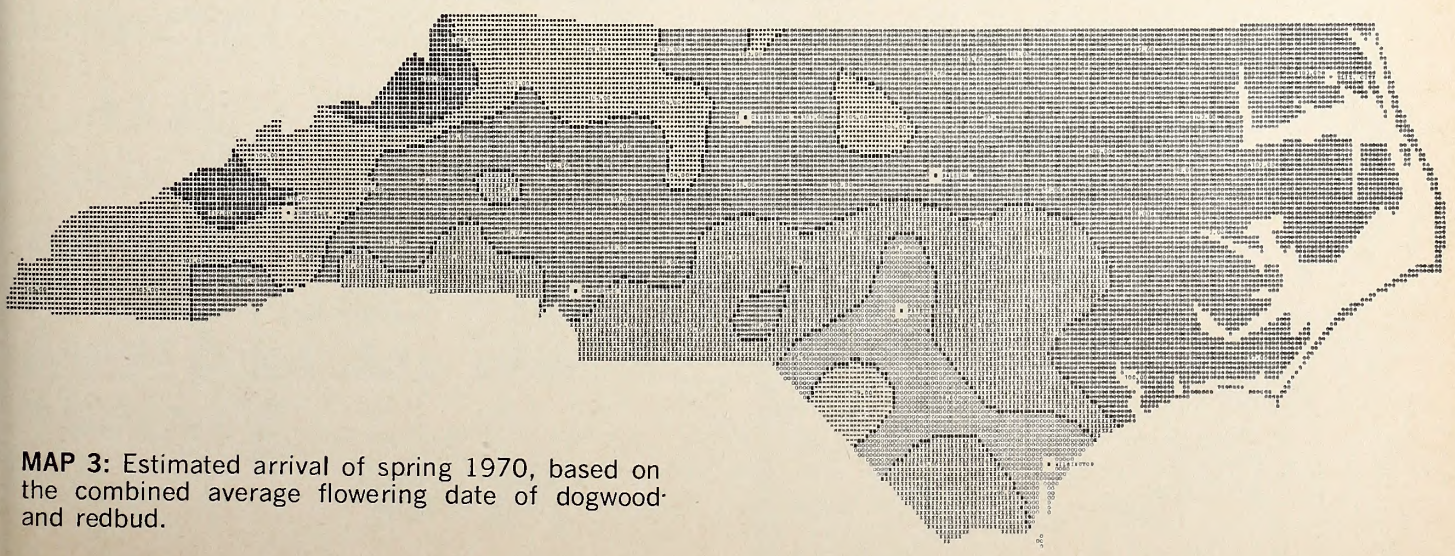
• **Text concluded on page 18**



MAP 1: Estimated arrival of spring 1971, based on the combined average flowering date of three flowering trees **(Cornus florida, Cercis canadensis,** and **Acer rubrum).**



MAP 2: Estimated arrival of spring 1971 based on the combined average flowering date of dogwood **(Cornus florida)** and redbud **(Cercis canadensis).**



MAP 3: Estimated arrival of spring 1970, based on the combined average flowering date of dogwood and redbud.

enough to determine the relationship between flowering date and specific environmental parameters, such as temperature or day length, at various latitudinal, longitudinal and altitudinal combinations throughout the state. Present flowering patterns, based on two years' data, indicate that there is a definite relationship between the elevation and geographical location of an area and flowering date (Fig. 1). We hope to strengthen our predictive equations by receiving additional data from our observer network in the coming years, especially from those counties which could not be plotted in Fig. 1.

In addition to recording the date of the arrival of spring, we would like to know the date of the arrival of fall in the same areas, and by subtraction, to arrive at the length of the growing season. In the autumn of 1970 our observers reported on the date of the coloring of red maple *(Acer rubrum)* and yellow poplar *(Liriodendron tulipifera)* leaves. We would like to repeat these observations in the autumn of 1971. While it may be less exciting to note the date of the coloring of a leaf than it is to observe flower opening, if we are to understand the relationship between environmental rhythms and plant activity we must also determine the terminal dates of seasonal activity in these species.

If you have previously submitted a response form, or have in some other way indicated an interest in helping, we will be sending you a fall response form in the near future. Instructions for making the required observations will be included. If you have not participated in our program as yet, but would like to, send your name and address to:

North Carolina Phenology Project
c/o Richard Reader
Department of Botany
University of North Carolina
Chapel Hill, N. C. 27514

We will be happy to mail you as many response forms as you require, as well as instructions for making observations. To those of you who have helped us in the past, we would encourage you to inform your neighbors of our project, or to form your own observer network and forward the responses to us for evaluation. We are looking forward to hearing from you.

The relationship between combined average flowering date of dogwood-redbud (horizontal axis) and elevation (vertical axis) is based on the average county flowering dates reported in 1970 and 1971. County averages were plotted only if the calculated flowering average was based on at least ten responses, and data was received both in 1970 and 1971. The horizontal spread of data points at any elevation is due to latitudinal differences between counties. The linear regression equations expressing the relationship between altitude and flowering date for counties south of 35.5°N is:

Flowering date = 88.99 + (0.00844) (elevation in feet) r^2 = 0.89

and for counties north of of 35.5°N is:

Flowering date = 94.50 + (0.00855) (elevation in feet) r^2 = 0.74

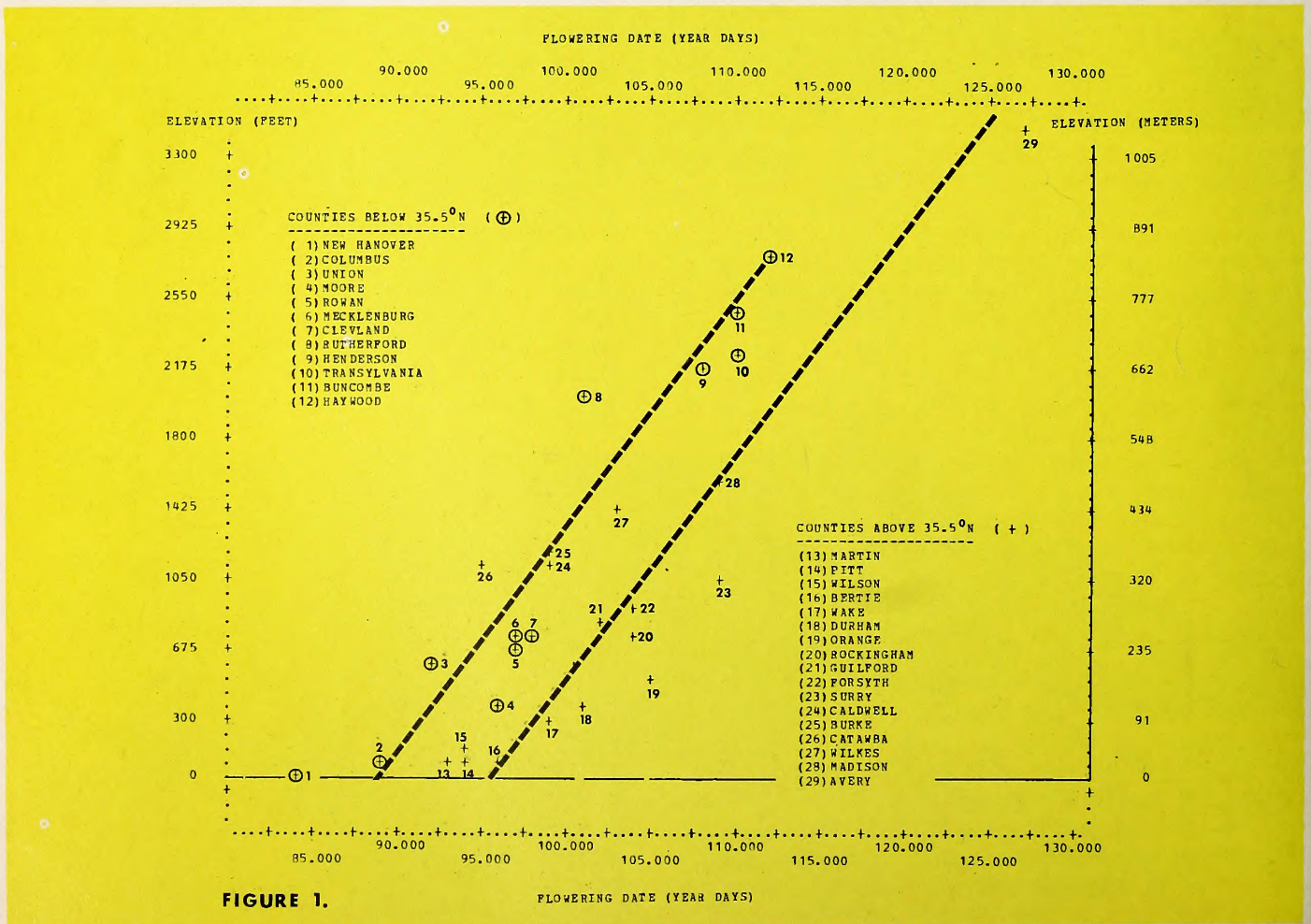
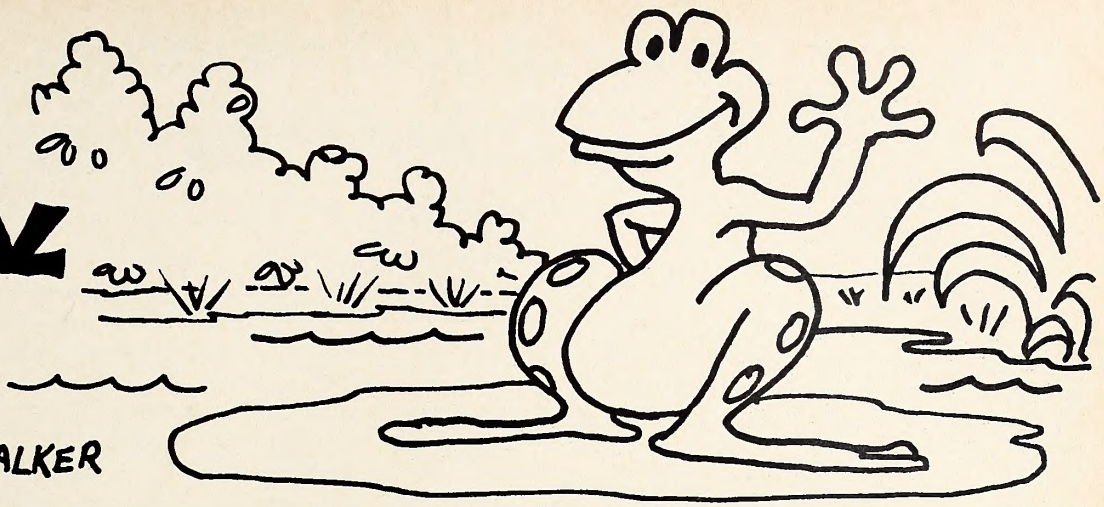


FIGURE 1. FLOWERING DATE (YEAR DAYS)

THE MOST LOGICAL FROG ©

by
JANE & DERRY WALKER



HI, BOYS AND GIRLS: DON'T CALL THE GARDEN SPIDER AN "INSECT." INSECTS HAVE SIX LEGS. SPIDERS HAVE EIGHT LEGS. THEREFORE, SPIDERS BELONG TO A CLASS CALLED "ARACHNID." (A-RACK-NID) THE GARDEN SPIDER, LIKE OTHER SPIDERS, IS A MEAT-EATER, AND SPINS WEBS TO TRAP INSECTS FOR FOOD. SPIDERS THUS HELP CONTROL THE NUMBER OF INSECTS!

READ ABOUT SPIDERS IN YOUR SCIENCE BOOKS OR ENCYCLOPEDIA. FIND OUT WHICH SPIDERS ARE DANGEROUS AND WHICH ARE NOT.

L.F.

Fish and Wildlife Technicians

by George E. Burdick
Fish and Wildlife Coordinator
Martin Technical Institute
Williamston

STUDENTS who are highly motivated to outdoor professions may now enroll in several programs being offered at technical institutes and community colleges across North Carolina.

Martin Technical Institute, near the Roanoke River at Williamston, North Carolina, is offering a two-year course of study in Fish and Wildlife Management.

Other similar programs are currently being offered at Haywood Technical Institute in the mountains and Wayne Community College, Goldsboro, North Carolina. In addition, Lenoir Community College, Kinston, offers a course in Fisheries Research and Management and Cape Fear Technical Institute, Wilmington, a program in Marine Science.

It was only natural that as the community college system became established in North Carolina, the need for trained technicians to protect the quality of our environment, was recognized. The North Carolina Wildlife Federation gave early support to the concept of upgrading the training of professionals charged with the responsibility of managing our fish, wildlife and marine resources. Various professional biologists, University professors and interested sportsmen were consulted prior to establishing a curriculum.

Then, in keeping with the community college approach to learning, only experienced instructors were hired at the various schools to teach enrolling students. In a technical institute or community college, recent practical experience is probably the single most important requirement for hiring instructors. Many PhD's now teaching in universities would likely not qualify as technical instructors unless they have at least five years of field experience.

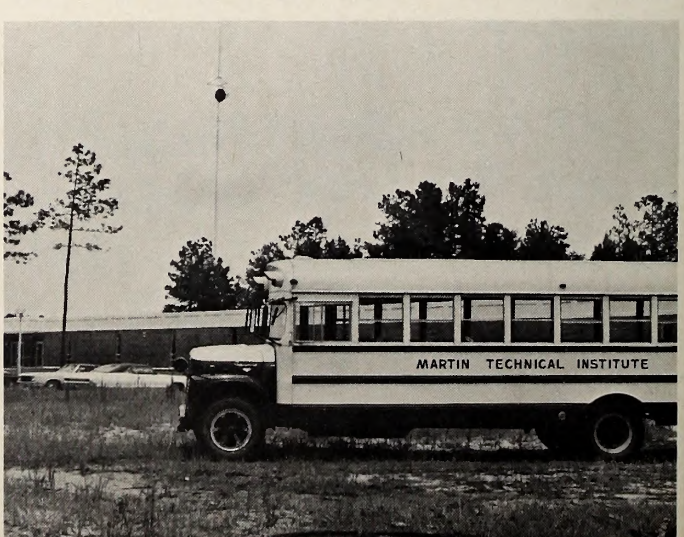
This article is about Fish and Wildlife Management as it is currently being taught at Martin Technical Institute. We recognize that no two schools will be identical in teaching any program and in fact no two courses are ever the same even when using the same textbooks.

We emphasize the practical approach. Outdoor experiences in all sections of our state are considered a necessary part of our training program. Students visit salt marshes on the coast, tupelo-cypress swamps in eastern counties, upland game areas in the Piedmont and trout streams in the mountains. The way to learn to appreciate natural resources is to see them through the eyes of wildlife protectors, fisheries inspectors, refuge managers and sportsmen. We visit fish hatcheries, game management areas and commercial shooting

Author Burdick sets up a spotting scope near a wooded pond so that a class can observe wildlife in a natural setting. Field trips provide one of the best learning experiences for the wildlife students.

PHOTOS BY LUTHER PARTIN

One of the important items of equipment at Martin Technical Institute is the bus. It provides convenient, available transportation during the school year for visits to a wide variety of places.



preserves. We attend public hearings concerned with game and fish regulations and pollution controversies.

If any issue is likely to have an effect on the future well-being of our outdoor resources, we want to know about it because we want to inform others about their obligations in conserving natural resources.

You might see our students catching brook trout near Santeetlah, observing oysters in Brunswick County or hunting bobcats south of the Albemarle Sound. They might be seen observing wood ducks on a beaver pond in Northampton County, Canada geese at Lake Mattamuskeet or tracking wild turkeys in the snow at Caswell Wildlife Management Area. In short, we try to make our field trips relevant and meaningful. The great outdoors is our laboratory while we attempt to gain an in-depth practical understanding of ecology as it relates to hunting and fishing.

Employment

We are not certain just what the future job opportunities will be for our graduates.

We conducted a nationwide survey which indicates a definite trend in the direction of improving the training of fish and wildlife professionals. Several states require two years of technical academic training beyond high school before hiring game wardens. At least one state requires a four-year degree of its conservation officers.

North Carolina has been able to secure an outstanding force of refuge managers, wildlife protectors who are high school graduates with little technical training except in-service training schools. However, it is only right that the most qualified people be hired for positions serving the public. In future years, we fully expect our graduates to be listed among those "best qualified."

It is my personal opinion and belief that North Carolina should follow the lead of several other states and create field level positions for "Biologist-Aides." There are many important jobs which two-year technicians could accomplish while working under the supervision of a Wildlife or Fishery Biologist.

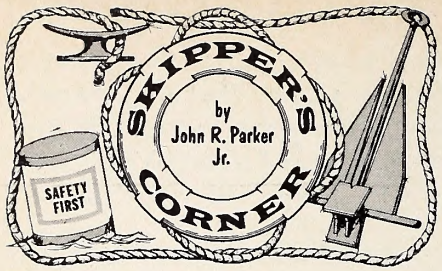
It is the philosophy of our school that we should try to develop the entire person. We concentrate on technical skills but also strive to turn out responsible citizens.

It is our intention to teach them about our environment so that they can make a contribution to preserving the quality of outdoor living in our state and nation. ⬍

A technical institute or community college may be your answer to the training necessary for a career in the wildlife field. Contact the Department of Community College, Raleigh, N. C. 27602 for details.

A model of the future physical plant of Martin Technical Institute is examined by the Institute's President, Dr. E. M. Hunt (left) and Architectural Drafting Instructor Ed Taylor.

A trip through hardwood bottomland reveals the nature of this type of wildlife habitat. "Book work" is necessary in the library, too.



LEGISLATION affecting boating was included in the business of the 1971 General Assembly which adjourned on July 21. Three bills were passed which amended or added to the state's boating safety law, General Statutes, Chapter 75A. Another pertinent and rather "unique" local bill was also passed. While it was not included in the boating chapter, it could affect certain boat operators.

Perhaps one of the most significant pieces of boating safety legislation to come out of the recent Assembly finally brings into the fold some nine southeastern counties which were heretofore exempted from certain boating safety requirements. Senate Bill 206, supported by the Wildlife Resources Commission, now requires that in the counties of Brunswick, Carteret, Columbus, Chatham, Duplin, Lee, New Hanover, Onslow, and Rockingham boats powered by machinery of 10 horsepower or less must carry at least one life-saving device for each person on board and that such boats must be equipped with a white stern light or a flashlight ready at hand to prevent collision. Many boat operators in these counties have been so equipping their small craft all along due to common sense and in spite of their privilege of exemption. A few of those who have not been so doing may not be around to read about this change.

The above-described part of Senate Bill 206 was a step forward in boating safety.

A second part of Senate Bill 206, not supported by the Wildlife Resources Commission, involves a change in light requirements for the same boats mentioned above. This part includes statewide coverage. Section 6 (n) of Chapter 75A was amended so that boats of 10 horsepower or less are required to display or have ready to display lights, as described above, from one-half hour *after* sunset to one-half hour *before* sunrise. The law for this state, other states, and the federal law reads, *sunset* to *sunrise* on all navigational lights. Boats of over 10 horsepower are still controlled by the sunset to sunrise part of 75A. And—here is the messy part—boats of 10 horsepower or less are still governed by federal law if operated on navigable waters of the United States, coastal waters, and/or inland waters patrolled by the United States Coast Guard.

What's all the fuss about a half hour give or take? Well, if you follow the letter of the law and operate a half hour before sunrise, unlighted, on a gray morning, you may find yourself being run down by another craft, unaware of your presence. Or if you so operate, you could pick up a ticket from a Coast Guard boarding officer doing his job.

The purpose of this change is not known to this writer, and certainly it does not contribute to boating safety. Further, it takes us another short step away from national uniformity which does not necessarily guarantee the good life, but sometimes makes good sense. Boaters, use your common sense.

Owners of motorboats should know that Senate Bill 16 adds to Chapter 75A by extending the "family purpose doctrine" with regard to liability for negligence to the operation of motorboats or vessels as applicable in tort cases arising from the operation of motor vehicles. A tort case (wrongful act in which a civil action may follow) may arise from the violation of criminal law. And "family purpose doctrine" is a method developed by court decisions whereby the owner is responsible for any negligence on the part of a member of the family to whom he has given permission to operate a boat. In other words, dads you are now legally responsible if junior drives the family ski boat through the side of your neighbor's cruising houseboat. This is not a boating safety bill as such but stems from the vast legal workings of the Assembly. It does make sense and will no doubt provoke some safety thinking.

House Bill 1060 also adds to Chapter 75A, but it too is not a safety bill as such. It deals with legal actions and courtroom workings. It provides that in civil actions brought about to recover damages for property damage or injury to or the death of any person resulting from a boating accident, proof of registration or documentation of a motorboat is prima facie evidence of ownership, and proof of ownership is prima facie evidence that the boat was being operated with the consent and knowledge of the owner by a person for whose conduct the owner was legally responsible.

The purpose of this law is to ease the burden of the plaintiff in a civil case in proving that the person who caused the damage, injury, or death was acting as the "agent" of the owner of the boat and that the person in whose name the boat was registered was the owner. As mentioned, this bill does add to the state's boat law but deals strictly with legalities. One thought from the practical viewpoint: be sure about the operating capabilities of the person to whom you lend your boat; and if it is stolen, let that unfortunate event be known to authorities immediately, lest you be caught up in an accident caused by a thief.

Finally, in the legislative roundup from this Corner, a comment or two about a deer protection bill that could affect certain citizens who use their boats in hunting activities. House Bill 544 as ratified is introduced as "An Act to Prevent Facilitation of the Unlawful Taking of Deer with the Aid of Boat by Means of Placing Restrictions Upon the Possession of Firearms Aboard Motor-Pro-

pelled Vessels in the Cape Fear River in Bladen County."

"Section 1. No person aboard a motor-propelled vessel on the Cape Fear River in Bladen County shall have in possession a firearm during the open season for taking deer. No person in charge of any motor-propelled vessel on the Cape Fear River in Bladen County shall permit anyone to have in possession aboard such vessel any firearm during the open season for taking deer.

"Section 2. As used in the Act, a motor-propelled vessel includes any vessel propelled by machinery or equipped with propulsion machinery, except that the term shall not include an outboard-motor, the motor for which has been completely removed from place and stored aboard the vessel."

Taking of game, in this case deer, from any vehicle, including power boats (and for deer specifically, the list includes other floating devices such as paddle boats) has for many years been illegal in most counties including Bladen.

Shooting deer from a motorboat is an enforcement problem, and is a deplorable act. And there are local laws on the statute books which touch on the subject in a slightly different manner. This law, however, as you can see, deals with the *possession and transportation* of your favorite smooth-bore, rifle or pistol along approximately 70 miles of state and United States navigable waters. Duck hunters beware (and all other hunters traveling to your favorite hunting area by boat). I will forgo the temptation to further editorially comment on this one with this exception, the bill rings a bell (a ship's bell), something about the "right to bear arms."

Look Down On A Rainy Day

Excessive rain or frequent storms often cause a rapid rise in the level of a river and even in some lakes. When this happens there is usually an increase in floating debris picked up from the water's edge.

When running a river that has risen due to rain or through release of water from an upriver dam, keep an eye on the water for partially submerged objects. It's always a good idea to scan the water ahead of your craft, but especially so after heavy rains. Submerged objects that float just beneath the surface can be very damaging to boat or motor.

If You Flip Stay With It

If your boat swamps or capsizes, stay with it. Flotation is inherent in a boat built of wood. Most boats built of fiberglass or aluminum have water tight compartments to keep them afloat, or built-in flotation materials. If you flip or tip, it is much safer to let the boat keep you afloat until help arrives than it is to attempt to swim for shore.

What Water Means To Me

by Vanessa Walker
Thomasville

This essay was judged the first place winner in the Davidson County conservation essay contest for sixth grade students. Vanessa is a student at Hasty School and is the daughter of Mrs. Gilda Walker, Route 4, Thomasville. We are grateful to Robert W. Conner, Director of the Conservation Council of North Carolina, for furnishing us with this thought-provoking piece.

WATER is one of the natural wonders of the world, a key resource. It dominates every activity of man, and yet we have not given this "miraculous liquid" proper recognition.

Before going into what water means to me, I would like to share some of the facts that I have learned about water. First, due to evaporation and water cycling, every glass of water that we drink contains water molecules which have been used countless times. Second, water comprises about 70 percent of the human body and man cannot live over six days without water. Third, water, our constant companion, covers three fourths of the earth's surface and hides in the soil and air. Fourth, only three percent of the earth's water exists as fresh water, and three fourths of this lies frozen in glaciers and ice caps. Fifth, water serves as an important tool. It irrigates crops, carries waste products, generates power for electricity, cools the earth, transports goods, provides recreation and cleans the earth. Finally, this simple molecule acts as a great dissolver which breaks other molecules apart.

Water holds the most strategic position in the game of life. Just as ancient cities became abandoned ruins, when water was mismanaged, without water our whole planet will become a barren wasteland.

Water means responsibility to me. We must control and conserve it if life is to continue. We must stop exhausting our fresh water supply, seek new sources to meet growing demands, and keep existing natural sources clean and usable.

To do this, farmers must practice contour farming to control silt.

Engineers must build dams to stop erosion, prevent floods, and provide storage.

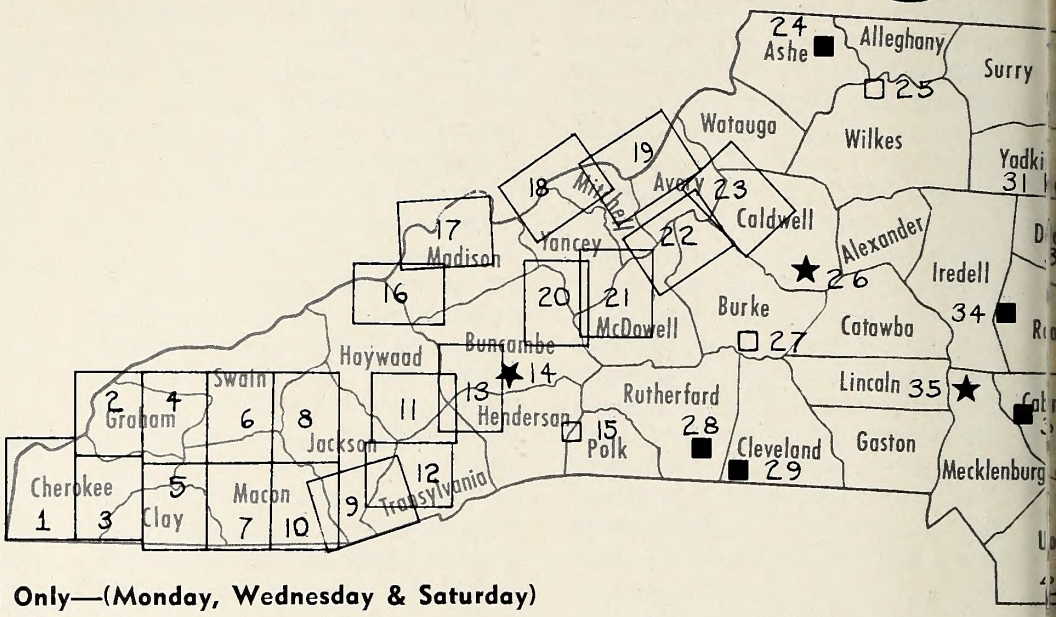
Scientists must find better ways to desalt the ocean and stop pollution. If we are to have the right amount of water at the right time, water conservation must become a co-operative effort.

Water means life to me. It calls me to awareness, to responsibility, to action. Water is a sacred trust. When it is used properly it will serve us well.

The next time you take a drink,

THINK!

Dove Hunting,



Dove Hunting Only—(Monday, Wednesday & Saturday)

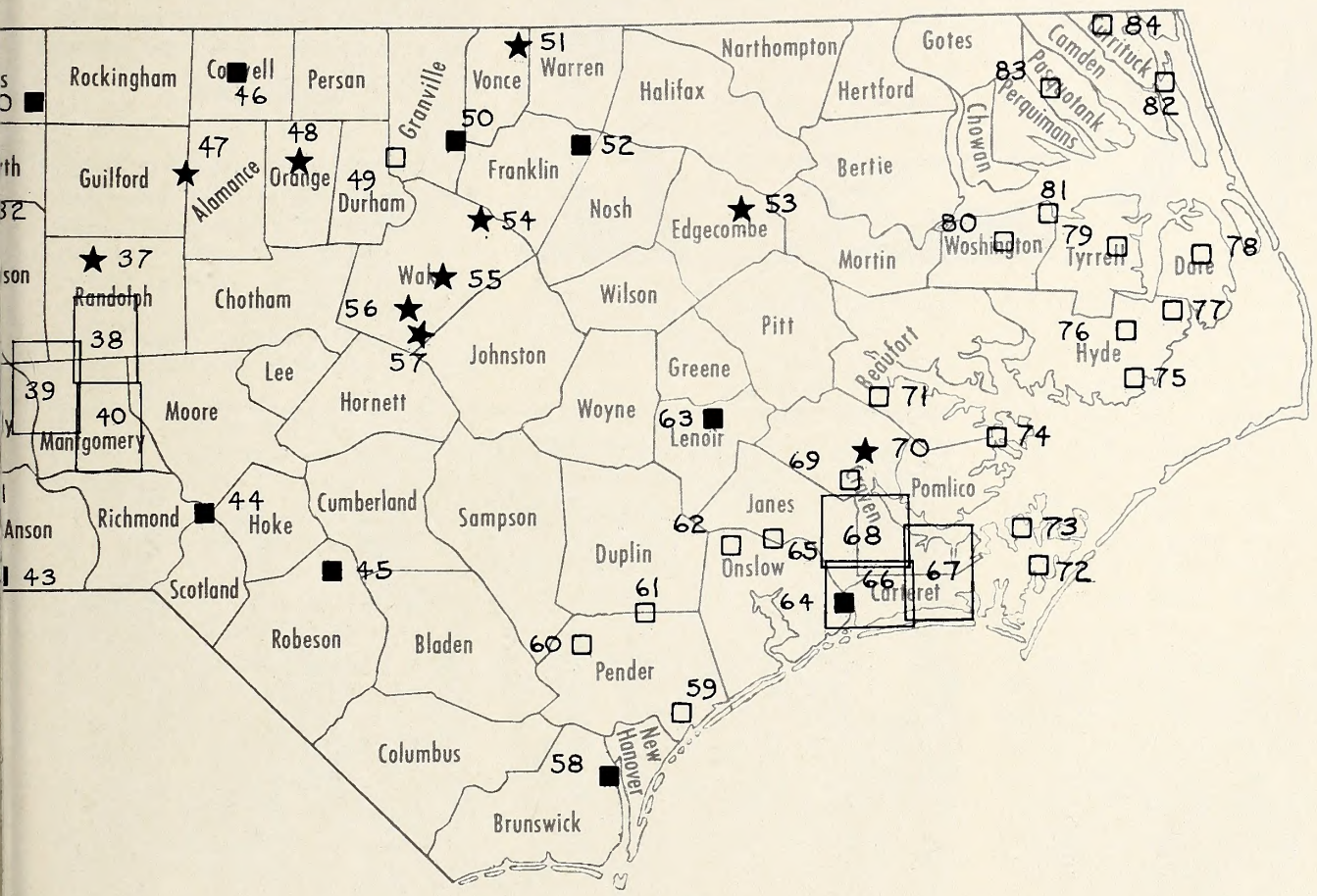
★14 Wilburn J. Parks Game Land
★26 Wilson Farms Game Land
★32 Charles W. Davis Game Land
★35 Mrs. Evelyn Browder Game Land
★37 Rand-Dale Farms Inc., Game Land
★41 James R. Braswell Game Land
★47 Guilford County Farm Game Land
★48 Frank Perry Game Land
★51 Nutbush Peninsula Game Land
★53 Bill Dail Game Land
★54 Roy Ed Jones, Jr. Game Land
★55 Dorothea Dix State Hospital Game Land
★56 Seth Fish Game Land
★57 Howard Bullock Game Land
★70 Robert and Eunice Heath Game Land

Any Game (except as noted) Monday, Wednesday & Saturday

■24 Carson Woods Game Land
■28 Cone Mills Game Land
■30 Sauratown Plantation Game Land
■33 Cooleemee Plantation Game Land
■44 Sandhills Game Land
■45 Keith-King Farms Game Land
■46 Caswell Game Land
■50 Corinth Community Farms Game Land

Note: Although all the areas shown on this map are open to dove hunting, only those listed above are managed for doves and are recommended for dove hunting. Consult the Game Lands map book obtainable with your Game Lands Use Permit.

1971-72



Dove hunting in North Carolina begins at 12 o'clock noon on September 4, and continues through October 9. The second segment is from December 13 through January 15. The Game Lands areas listed here have been specially managed for doves and will be open to public hunting during the season Monday, Wednesday and Saturday of each week, plus Federal holidays. Doves may be hunted from noon until sunset. The daily bag limit is 12 this year, with a possession limit of 24 after the first day.

A Game Lands Use Permit costing $6 (good for the entire season on any Game Land) is required in addition to a hunting license. For further information on hunting these areas, please refer to a copy of the current Hunting and Trapping Regulations.

When the 1971 General Assembly placed bobcats and the American panther under legal protection, few members were completely aware of how far-sighted this legislation may turn out to be.

In the case of bobcats, these animals have been hunted and trapped relentlessly for hundreds of years. They have been able to survive in the face of this adversity, but there is no question that they have become scarce, and there is no question of their value as predators in the balance of nature. Further, the law giving the Wildlife Commission authority to set seasons and kill limits on these animals will keep a lot of deer poachers out of the woods during spring and summer months on the pretext of hunting bobcats.

Panthers are something else, however. A number of qualified biologists believe these beautiful animals have become extinct. Others, subscribing to the extinct theory, believe panthers may have returned to North Carolina from surrounding states and have become established. There are too many reports of sightings by reliable people including National Park rangers, physicians, wildlife protectors, two members of the General Assembly, and others.

At any rate, we now have a law placing panthers under complete protection. Next month at least three, two-man photographing teams are going to comb the swamps of eastern North Carolina in the hope of getting at least pictures (and plaster casts) of panther tracks, and who will have a one-in-a-million chance of photographing one of these animals in its natural habitat.

From pure logic, it could be reasoned that panthers really don't exist in North Carolina. Panthers and black bears occupy the same general habitat. Why haven't packs of bear hounds ever treed a panther, giving hunters a chance to at least see one? To answer that, panthers are speedy animals. If put up by a pack of bear dogs, they could quickly and easily get out into a swamp so dense that even though the pack were to tree one, hunters could never hack their way through the jungle-like vegetation to witness the event. And there are records of dogs returning to their owners with their tails between their legs and whimpering. Time will tell if panthers are still a part of the North Carolina scene.

Rare Bird?

Dear Sir:

Several years ago I observed a huge silver eagle in this area that had one wing hanging down as if crippled and was flying real low. This year there are several, evidently, in the area here. They shine like aluminum with the sun on them, almost. I do not know what they are called, but do think they should be protected.

One flew down off the mountain in back of this old mine company store and caught two blackbirds in the air. Then another day we watched one fly around for about ten minutes hunting and caught some pigeons. Then one man spoke of a chicken gone. My father, mother, and I have witnessed this kind of thing several times this spring.

Could you identify the eagle and see if something could be done to protect them for young people are shooting at them for fun. I do not know who else to contact.

Thank you so much for your help and hope to hear from you.

Dartha Cloninger Franck
Cranberry

Dear Miss Franck:

Your letter to the Wildlife Resources Commission has been referred to us for a reply. It is doubtful that the answer you are receiving is complete because the bird which I think you may have seen is rare in our state.

I hope it may be a goshawk (*Accipiter gentilis*), as this would be the third sight record for our state. The goshawk is about two feet from head to tip of tail, and has a wing spread of 3½ to 3¾ feet. A mature adult is bluish slate-color above and whitish on the underside. Looking down on the bird which is reflecting the sunlight would give the appearance of being a silver color. The habits of this hawk are such that he may be betrayed because he likes to catch birds in flight (which you saw), and is quite fond of pigeons.

In days of heraldry, the goshawk was flown only by the King because he was such a good hunter.

If this is the kind of bird you are seeing, I sincerely hope you will be able to persuade people not to shoot the bird. It is extremely rare and unusual and really it is quite a treat to have one among us.

William L. Hamnett
Director
N. C. State Museum

Health Bulletin Free

Clay Williams, Editor, of "The Health Bulletin," the official monthly publication of the State Board of Health, reminds "Wildlife" readers that the Bulletin is available free by writing: THE

HEALTH BULLETIN, N. C. State Board of Health, P. O. Box 2091, Raleigh, N. C. 27602. Clay furnished us the opossum story for our June issue, and hopes to have more interesting features about ready.

Book Review

When you finish reading Ronald Rood's new book "Animals Nobody Loves," you probably won't love the creatures he discusses any more than you did before reading the book. But you will have a great deal more respect and a kinder regard for them, and you will love reading the book.

"Animals Nobody Loves" is as scientifically accurate as it is possible to be in writing about any form of life. But it is easy reading—the kind of book you will want to pick up time and again to refresh your memory on what Rood has to say about wolves, rats, fleas, mosquitoes, pigs, bats, octopuses, snakes, spiders, vultures, and eels.

The book is well worth the $6.95 price tag. Russ Buzzell illustrated many of its 215 pages. The publisher is Stephen Greene Press, Battleboro, Vt.

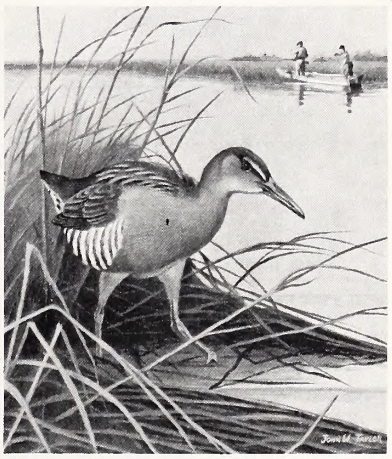
—Rod Amundson

Here are some of the results of the Second Annual N. C. and Virginia Kerr Lake Bass and Rock Tournament. David Hayes (right) Marvinsville, Va. took top honors in the bass category. Henderson Jaycees shown with prize-winning fish are (left to right) Tony Ervin, Tournament Chairman; John Shaw First Vice President, and Dick McIntyre, Jaycees President.

TIDE TABLES
Southport, N. C.

(Times shown are Eastern Standard Time)

Date		Day	Time	Height
Sept.	2	Th	5:36 PM	5.0
	3	F	6:30 PM	5.2
	4	Sa	7:18 PM	5.3
	6	M	8:30 AM	5.4
	7	Tu	9:18 AM	5.5
	8	W	10:12 AM	5.4
	9	Th	11:06 AM	5.3
	10	F	12:06 PM	5.1
Oct.	1	F	5:06 PM	5.0
	2	Sa	6:00 PM	5.2
	4	M	7:18 AM	5.7
	5	Tu	8:06 AM	5.9
	6	W	9:00 AM	5.9
	7	Th	9:54 AM	5.7
	8	F	10:48 AM	5.5
	9	Sa	11:42 AM	5.1
Nov.	1	M	6:06 AM	5.6
	2	Tu	6:54 AM	5.8
	3	W	7:48 AM	5.9
	4	Th	8:42 AM	5.9
	5	F	9:36 AM	5.6
	6	Sa	10:30 AM	5.3



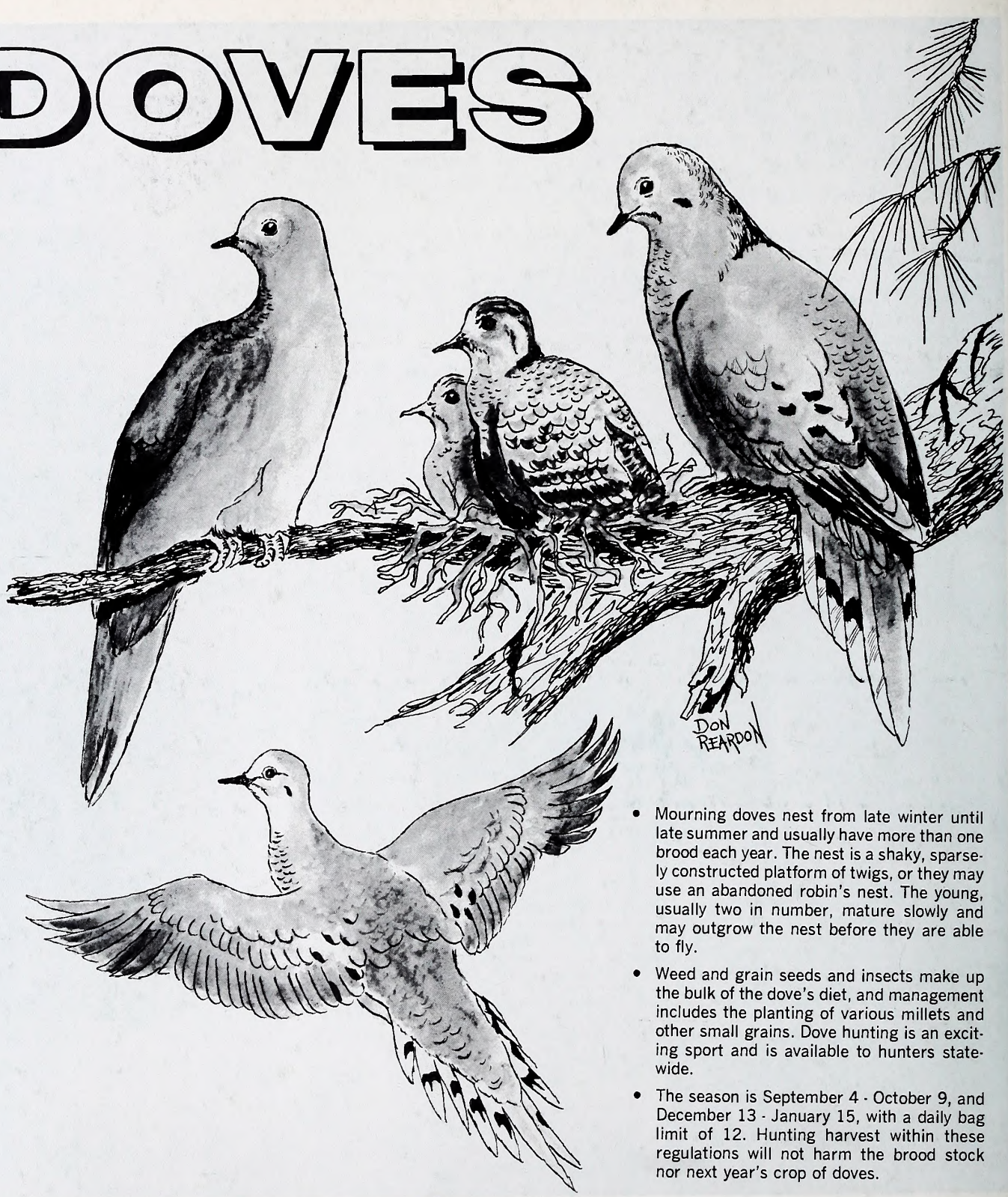
1971 National Striped Bass Derby

At daylight, October 16 the big stripers of Albemarle Sound and its incoming rivers become fair game for the eager anglers entered in the Elizabeth City Jaycees striped bass derby. This gala event is scheduled for October 16 and 17, and if the success of last year is any indication, plenty of sport and fun are in store for the teams of fishermen again this year.

Some 47 teams (four fishermen on each team) from Maryland, Virginia, and North Carolina went after the rockfish last year, and plenty of nice fish were weighed in at the end of the festivities. The Albemarle Sound area offers some of the best striped bass fishing to be found anywhere, and the crisp days of October bring the schooling fish to the surface. It's best to come prepared with at least a 16-foot boat and plenty of horsepower to get to the surfacing fish slashing bait.

For a look at the long list of prizes offered, complete information about rules, entry fees, and an official entry form, write Jerry Allen, Co-chairman, 401 Harney Street, Elizabeth City, N. C. 27909. You'll be in for a good time and lively fishing.

DOVES



- Mourning doves nest from late winter until late summer and usually have more than one brood each year. The nest is a shaky, sparsely constructed platform of twigs, or they may use an abandoned robin's nest. The young, usually two in number, mature slowly and may outgrow the nest before they are able to fly.
- Weed and grain seeds and insects make up the bulk of the dove's diet, and management includes the planting of various millets and other small grains. Dove hunting is an exciting sport and is available to hunters statewide.
- The season is September 4 - October 9, and December 13 - January 15, with a daily bag limit of 12. Hunting harvest within these regulations will not harm the brood stock nor next year's crop of doves.

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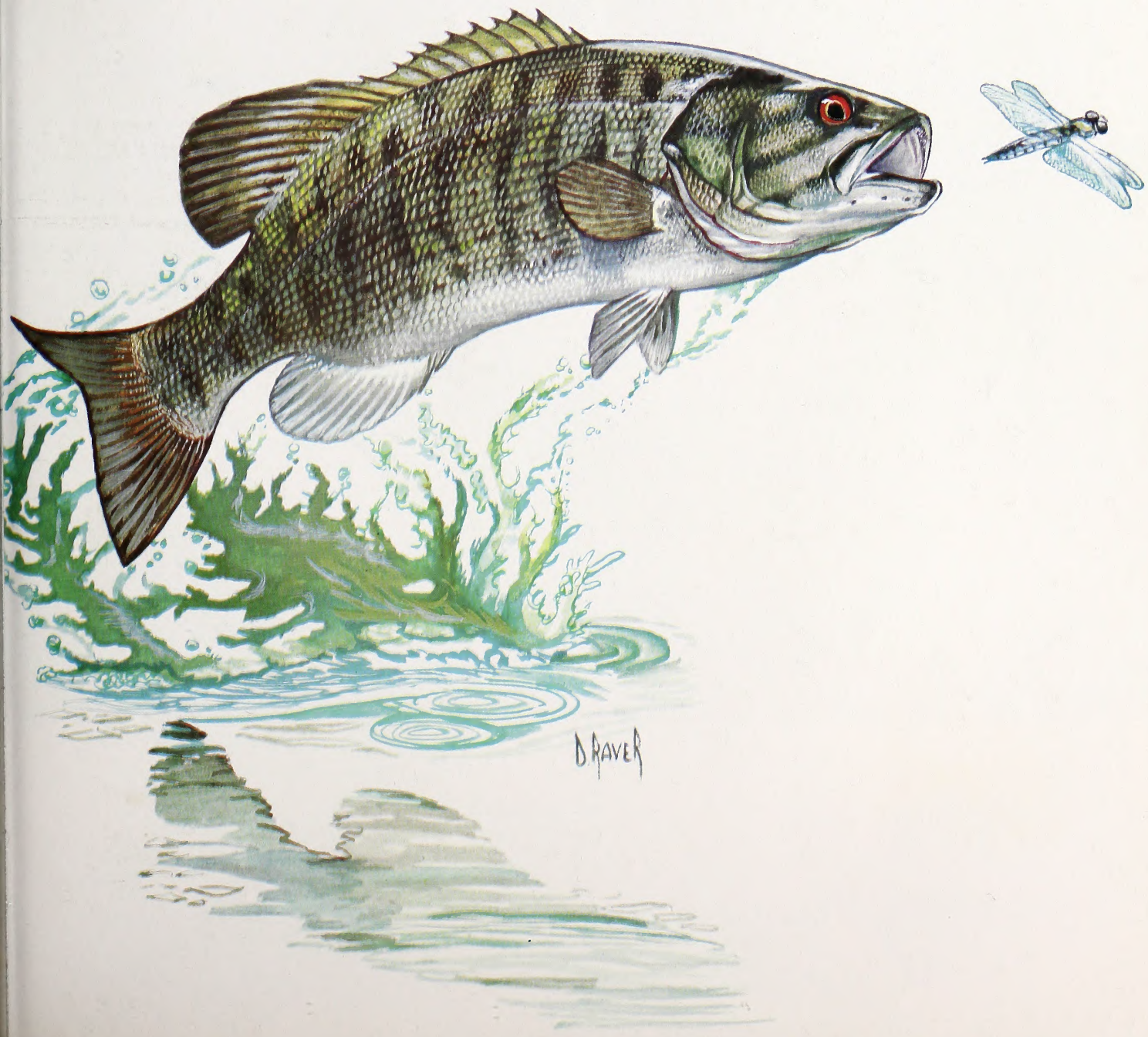

GRANDFATHER MOUNTAIN LAKE
PHOTO BY HUGH MORTON

For a Rainy Day

Jewels sparkle on the grass
Autumn is gowned in dew
Sunlight eludes through clouds
Morning haze blurs my view.

I'll take a stroll with Nature
And store pictures in my mind
For times when bleakness hovers
And the muses are unkind.

Squirrels and chipmunks toil
Storing nuts for winter food
I like them for companions
They seem to share my mood.

May each gather a harvest
His poignant needs to quell
When wintry rains descend
And in retrospect we'll dwell.

Josephine M. Upchurch

STATE OF NORTH CAROLINA

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GOVERNOR

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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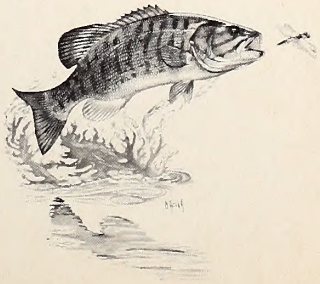
By October, Autumn is pretty well established in the Tar Heel State, and thoughts of the sportsman turn to hunting. But fishing has more than one fling left, and the acrobatic smallmouth often leads the parade. Yet the streams which are suitable for this great game fish are becoming fewer and fewer as siltation, overcutting of timber and pollution take their toll. Habitat restoration is the key to good game fish populations. Watercolor painting by Duane Raver.



We Need a New Approach to Agriculture

by George E. Burdick
Robersonville
Photos by Luther Partin

The author recently testified before a Subcommittee on Rivers and Harbors in the United States Senate. He cited some of the same opinions expressed in this article to point out that taxpayers' money is being used by the U. S. Soil Conservation Service and the U. S. Corps of Army Engineers to destroy our natural resources. George Burdick is an experienced Wildlife Biologist, formerly with the Wildlife Resources Commission, with graduate work in water resources and environmental planning, as well as a rancher. He explodes the "myth" that ditching projects and chemical agents are in the best long-range interests of agriculture.

WE named our property Tupelo Ranch, after the water tupelo (*Nyssa aquatica*) that grows along the run of Collie Swamp on the mile-long eastern boundary. Our wetlands timber makes up about one third of the total ranch acreage. Another third is in cropland and the final third of approximately 226 acres is in pine and upland hardwood types.

It is a low-lying tract of land with tremendous potential for a comprehensive approach to resource management. Similar farms and ranches are located adjacent to tupelo-cypress streams throughout eastern North Carolina.

Currently the economic advisors with the U. S. Soil Conservation Service and the U. S. Army Corps of Engineers are advocating ditching many of North Carolina's remaining streambeds and claiming benefits to agriculture and forestry resources. However, I'm convinced our agricultural and forestry priorities are changing and wholesale alteration of our remaining streambeds should be stopped immediately, while we take a new look at what we are destroying.

We have approximately 200,000 board feet of young tupelo and cypress growing on our side of the swamp run. The swamp is wide in this area and usually holds water even during dry weather. This provides ideal sanctuary for wildlife and is also producing a valuable timber crop.

I conducted a study of the veneer industry in northeastern North Carolina during 1970 and found commercial timber men to be highly concerned about the growing scarcity of raw material. Every veneer user interviewed believed that we are cutting tupelo, and destroying streambeds producing tupelo, at a considerably faster rate than it is growing back. The result—prices paid for tupelo are the highest in history—in some instances more than triple what they were in 1960. Many of the earlier ditching projects were "justified" without giving any considerations to the dollar value of wetlands timber destroyed by the projects.

It is my opinion that, from an economic standpoint, the flooded land on which our wetlands timber is growing could not be put to a more profitable use than it enjoys in the natural state.

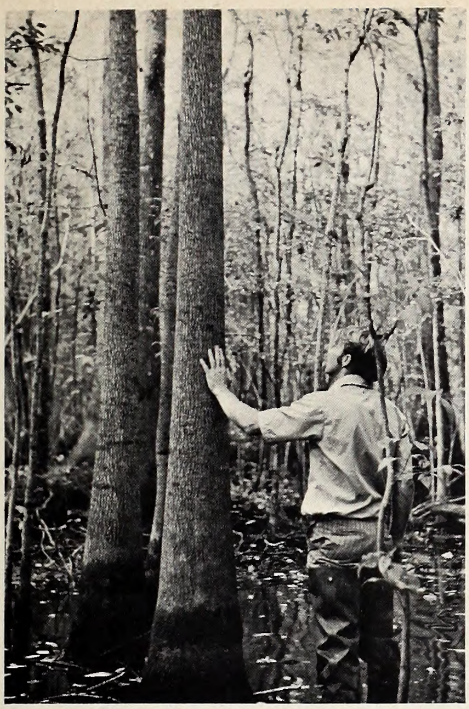
The swamp also serves a dual role of keeping the water table high. A high water table under the rest of our land makes it easier to produce maximum grain and forage crops even during dry years. I have been observing ditching projects in eastern North Carolina for over a decade and have personal knowledge of many farmers in various counties who helped promote ditching projects that dropped the water table. Then they later wished they hadn't when drought conditions resulted in lower yields than ever experienced before extensive ditching. Some of these farmers who originally helped the Federal agencies promote projects now wish they had their streambed back like it was before they requested assistance to drain their land.

North Carolina's second largest natural lake, Lake Phelps, is seriously threatened by extensive ditching in the surrounding area where new cropland is being created. The same threat exists, to a more limited extent, with a proposed ditch down the middle of Collie Swamp. We have a small ½ acre pond fed by an artesian well which we use as an outdoor recreation area for swimming. The water is cool and deep and is not connected on the surface with the swamp run. There is a sandy bottom and willows growing around the shoreline. Varied bird life, fish and aquatic life abound in and around the water. I tested the water and found it to be safer for drinking than many city water supplies.

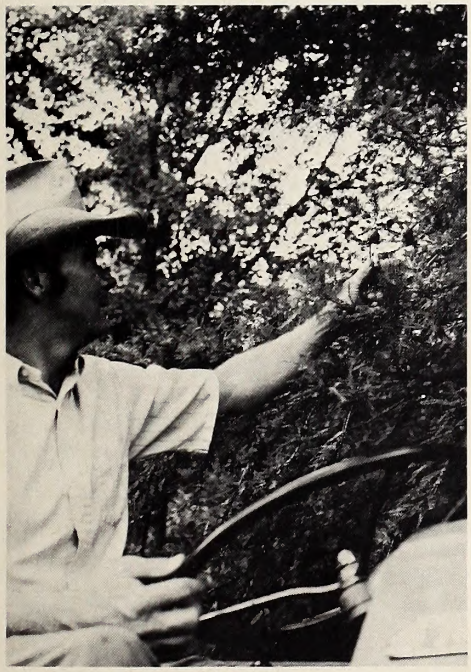
A fifty yard buffer zone of natural vegetation is growing around the pond to prevent sedimentation and runoff from pastureland. This buffer zone also provides valuable habitat for wildlife such as rabbits and quail. We spend many leisurely hours during the heat of summer swimming in this pond and definitely consider this corner of our land as valuable as any concrete pool.

If Collie Swamp is ever ditched by the U. S. Army Corps of Engineers, it will undoubtedly eliminate our artesian well and make it more difficult to hold water in any of our three ponds, two of which are sometimes used for watering livestock.

Again, it makes good sense to us from an economic standpoint to leave the swamp floor alone. The nearby streambed is directly responsible for



The valuable timber species that thrive in wetlands are often ignored in drainage plans. Trees like these (left) will be completely lost when the swamp area is drained. From a purely economic standpoint, it doesn't make sense to destroy wetlands. Natural drainage of surface water to swamp can be done with grassed waterways (above).



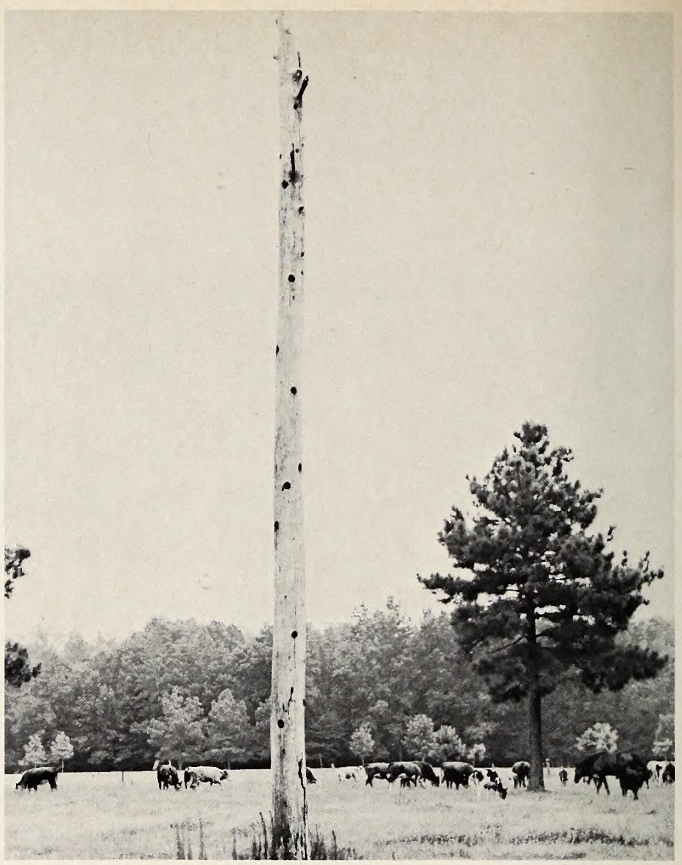
Left, author Burdick is within arms-length of cypress branches as he operates his tractor in one of the ranch fields, true multiple wise use of the land. Pastures can have brush piles and thickets for wildlife (below) if near natural cover. Agricultural practices can be adapted to wildlife and still maintain good yields.

the quality and quantity of water which we use both for livestock and for recreation.

Farmers in this area have been advised for years to ditch that worthless swampland and eliminate mosquitoes. Well, it will not work and has not worked. It is my personal belief that too many of our agricultural advisors are in a rut and afraid to advocate a new approach to water control.

A grass sod-way in our pasture does an effective job of allowing excess surface water to flow to the swamp. I plan a whole network of grass sod-ways as a preferred method of moving surface water to the swamp basin. The open drainage ditch usually fills in with eroded soil which sometimes creates more mosquito breeding holes than it eliminates. It's past time the Federal and State planners are allowed to use mosquito control as an excuse for altering all of our wetlands.

We decided from the very first when we bought our property that we would try to avoid excessive ditching and avoid using herbicides, insecticides and other chemicals which add to the pollution of our surroundings. I believe we have already proved, to our own satisfaction anyway, that most farmers in North Carolina use entirely too many chemicals in their agricultural programs. It sometimes takes a little longer and entails a little more effort to find a way to produce a given crop without total dependence on the poisons. But it presents one with a rewarding feeling to know he has produced an agricultural product that is less tainted with hydrocarbon residues than most foods in the stores.



This land is suitable for a bumper corn crop . . . and with no chemical controls for insects or weeds! Kobe lespedeza acts as a ground cover for weed control and serves wildlife as a source of good. Nothing goes to waste; even this dead tree has been left for nesting birds. Insect-eating woodpeckers live here.

We slaughter our own steers that eat no sprayed grass or legumes and are fed no sprayed grain. Our vegetables are organically grown and we also take great pride in being able to eat unpolluted tupelo honey from the bee hive which a friend leaves on our land. Bees pollinate our vegetables and forage crops such as Kobe lespedeza and Ladino clover and the beekeeper doesn't have to worry that we'll put out insect dusts that are deadly to bees.

We try to live with nature and become a living part of the ecosystem. Most farmers today are destroying the natural ecosystem and polluting our environment with the approval and sometimes the encouragement of our agricultural advisors.

For too long, in my opinion, we have put tobacco and certain other "money" crops in first place in North Carolina. Tobacco used to be planted on our ranch within thirty feet of cypress trees, despite the fact this land is better adapted for other crops such as oats, corn, lespedeza, soybeans and pasture mixtures. Why do we have to protect tobacco fields from flooding with Federal tax dollars in areas such as this which should never have been planted in tobacco in the first place? Our agricultural lands should be zoned according to the best use. Tobacco, which can be grown on thousands of soil bank acres on higher ground, should not be planted on the lowlands of eastern North Carolina,

Over 66,000 acres of tobacco which were planted in 1960 were not planted in 1970 in North Carolina due to reduction in allotments by the U. S. Department of Agriculture. Many of the acres of tobacco which were supposed to be benefitted by drainage projects in eastern North Carolina for thirty years in the future are no longer planted to tobacco. The engineers and economists should not be allowed to claim benefits to mislocated tobacco fields when they utilize tax dollars to ditch our remaining streambeds. The benefit-cost ratios used in the early 1960's were a hoax designed to dupe Congressmen and Senators into doling out our money to landowners who didn't mind getting "something for nothing" in the form of more unneeded cropland near a swamp stream.

There is growing evidence we are waking up to the total ecology of our world. Learning to appreciate natural streambeds is just part of the environmental shock in store for those in agriculture who have been set in their ways for so long.

We need a fresh approach to agriculture—one which recognizes that tobacco, which is not a food or fiber crop, should not be considered as sacred no matter where a misguided landowner wants to set it out. Our agricultural lands should be zoned for proper utilization.

I'm convinced that Collie Swamp, which serves so well the owls we hear at night and the wood ducks we hear at dawn, also serves us well. The well-being of all our wild creatures reflects our own and we should provide unpolluted natural habitat for them and us to enjoy together. ⬍

Flight of the Monarchs

by Nell Lewis
Greensboro

OCTOBER 4, 1935 was a typical autumn day in Burke County. Clouds held back the sun and surface fog softened the crispness of dying grasses. Glancing toward High Peak, I felt reasonably sure there would not be rain; fog drifted *down* the mountain and according to the older people of that area, the fog must go *up* the mountain for rain to come down.

That Friday morning did not begin special, other than for being beautiful. The trees were turning gold and red; dew had projected spider webs into lacy prominence; a flock of birds soared overhead; and a covey of quail lifted quickly from the barnyard when a cat interrupted their foraging for breakfast.

It was only when I returned from school at four o'clock that the day became memorable. A hundred or more monarch butterflies hovered around the tree when I went to gather a basket of apples. Suddenly there were more——and more——and more!

The air became filled with hundreds of thousands of these beautiful creatures. They rested lightly on my basket, my shoulders, in my hair, and one perched briefly on my cheek, like a soft caress.

The monarch butterflies were migrating south!

Their flight was amazing; light puppets on a string they bounced up and down, down and up in perpetual motion without ever colliding. They were from ground level to so high they were mere tiny dots against the sky. How could so many lovely bright wings be so silent?

As night cuddled the day in its darkness the far-wanderers came to rest on every available tree, and a short section of wire-mesh fence was so adorned with them it looked like a length of elegant fabric, all orange-brown etched with black and white.

When morning came my transients had flown away, gone on the first rays of the sun to seek the warmth of the southern United States and Central America, or perhaps to drift on soft trade winds to some far-off island to spend their winter.

No one really understands completely the migration of butterflies. Unlike birds, they apparently have no leader or guides to map their course or find ample vessels of nectar along the way. With the first chill of autumn, they simply begin congregating and when a great flock has gathered they lift away on their journey. Some of these swarms may fly only a hundred miles while others may travel thousands of miles.

In his book, "How to Know the Butterflies", John Henry Comstock stated that the monarch butterfly was not satisfied with their journeys to the north and south and that this strongest flyer of all the butterflies "does not hesitate to try its fortune over the seas, and has been found flying five hundred miles from shore. Either by flight or as stowaways in vessels it has pressed eastward to Europe and westward to the isles of the Pacific".

The female monarch butterfly which lives to be almost a year old, follows springtime back north after wintering in the sun (they have never been known to simply hibernate). She searches out new growth of the milkweed plants on which to deposit her eggs because this is the chief food of the larvae.

The eggs hatch in a few days—the time depends on the temperature—and the caterpillars begin feeding. They molt periodically, growing larger and hungrier each time. Just before the fourth molt they attach themselves to a stem or leaf, and hanging head down from threads of silk, they complete this molt in a few days to become a pupa without mouth parts or legs. They are now beautiful green chrysalides with bright dots of gold, waiting.

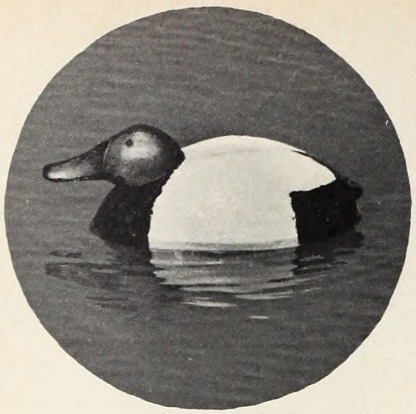
Within this "green house with golden nails" wonderful things begin to happen; wings grow, and legs and mouth parts very different from those of the original caterpillar's are forming. Instead of a crawling, chewing worm, there will emerge a winged beauty with a long coiled tongue, destined to float among the flowers, sipping nectar, dusting pollen from blossom to blossom.

Both male and female of the species have orange-brown wings bordered and tipped with black. Laced throughout the dark border are white dots of varying size. The male is easily identified because "on each hind wing he carries a black sachet bag for the allurement of his lady-love" (Comstock).

After mating, the female pushes northward, laying her eggs on milkweed to start another complete metamorphosis of the monarch butterfly, *Danaus plexippus*. The chain continues with generation after generation going north until the first chill breeze turns them southward again.

Both the caterpillar and adult stage of the monarch prove unpalatable to birds, the natural enemy of butterflies, and thus they enjoy more freedom than their kin. The viceroy butterfly, however, looks so nearly like the slightly larger monarch that birds avoid them too.

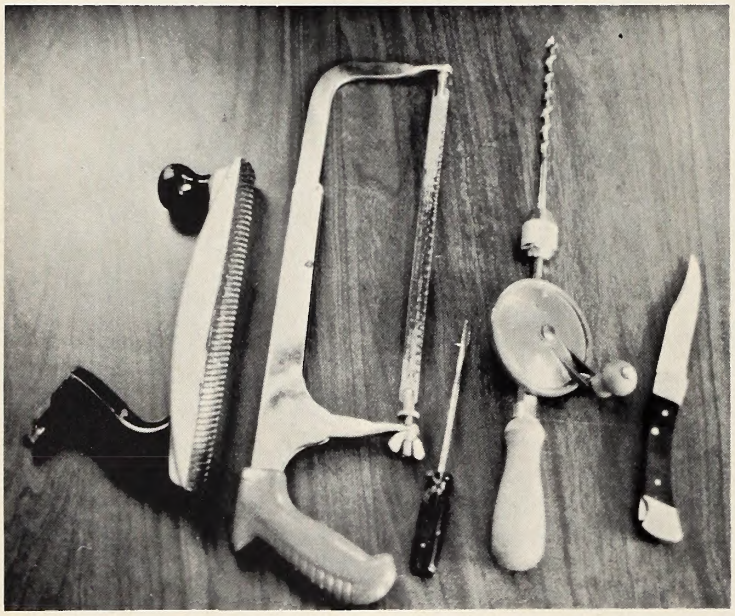
Perhaps there will be another time when I can have the pleasure—and privilege—of witnessing the flight of the monarch butterflies. But in our age of polluted environment who could dare hope that these beautiful, quiet creatures of nature remain in such great numbers as those of October 4, 1935? ◆



CORK DECOYS YOU CAN MAKE

by John Crew
Photography by Wall

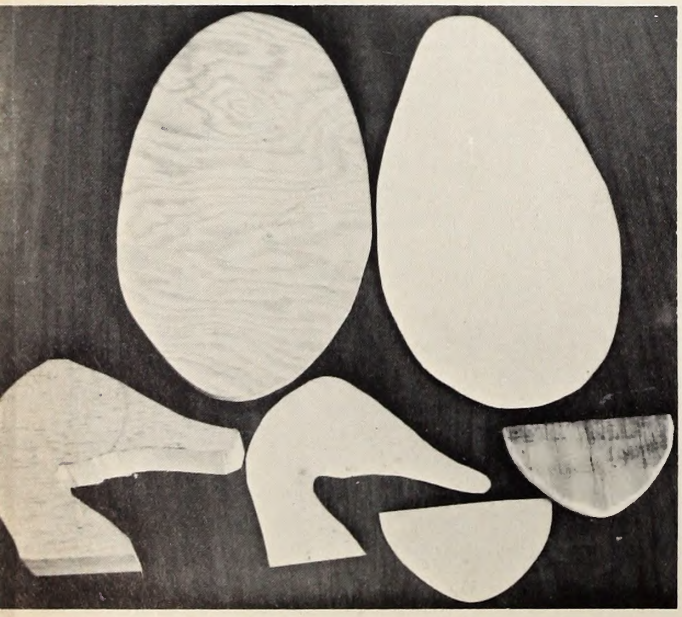
It won't be long until the ducks are flying our way. Will you be ready with a good set of decoys? You don't need to be an expert with tools to produce these blocks.

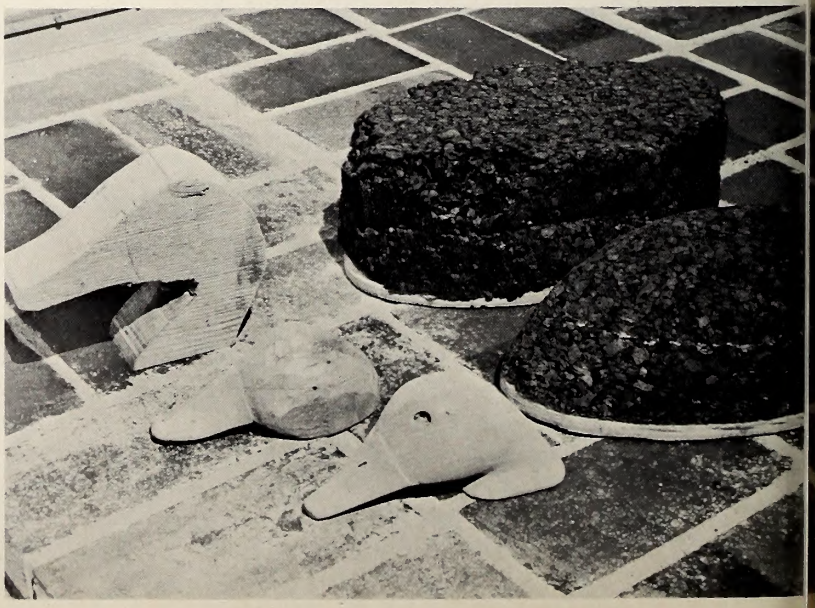


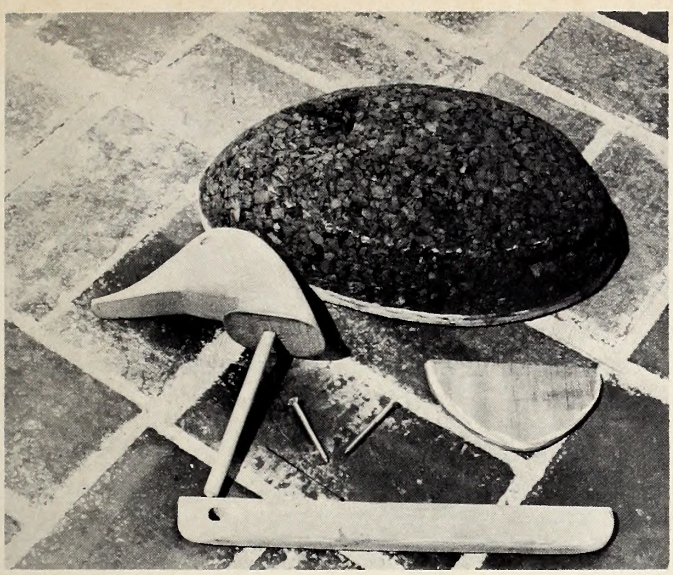
Only a few simple hand tools are needed: a rasp, saw, screw driver, drill, and a sharp knife are the most important. Use ⅜ inch marine plywood for the base, ½ inch plywood for the tails, and 2 inch clear white pine for heads. Pressed insulation cork 4 inches thick makes the 13 by 9 inch body. Heads should be at least 3 inches high.

Other materials include ⅜ inch hardwood dowels for attaching heads, glass eyes, ⅞ inch clear pine for keels, brass screws for attaching them, plastic wood, sandpaper, and plenty of glue.

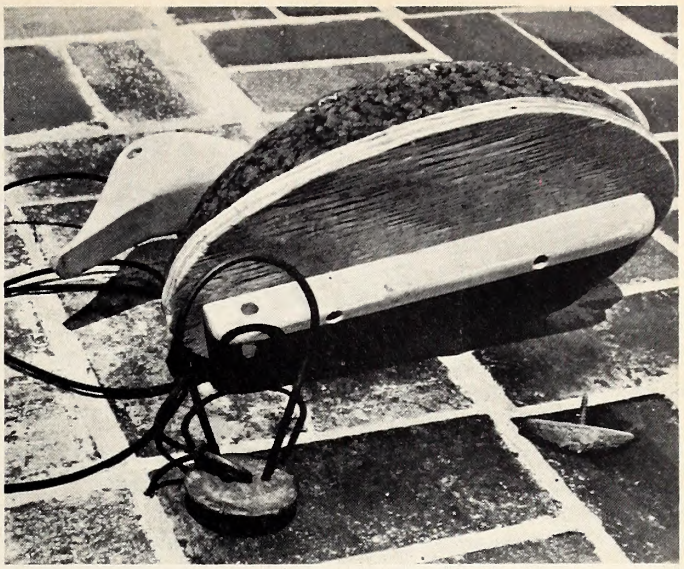
Cut out several base boards and glue them to sheets of cork with any good waterproof glue. Allow glue to set 24 hours and then shape cork bodies with rasp and knife. Shaping and pefecting heads will be the most difficult part of the construction. Keep trying.



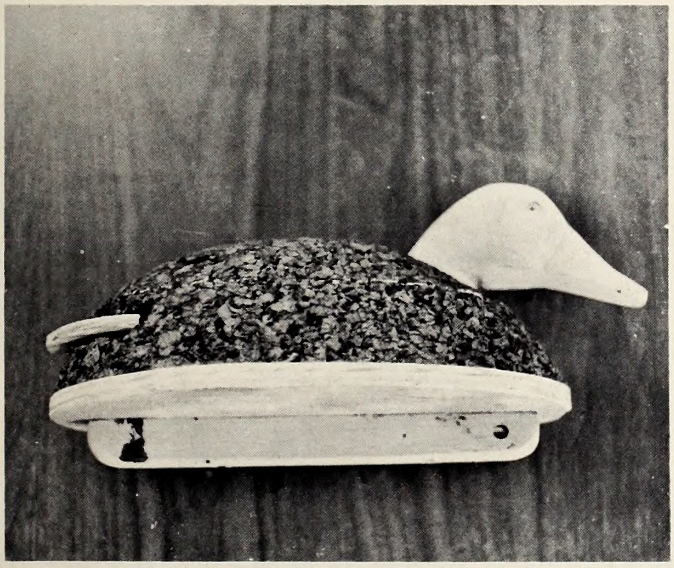


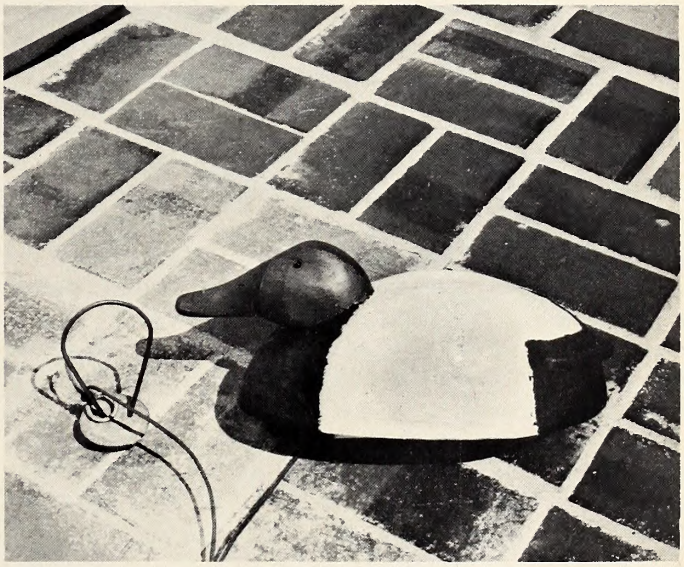


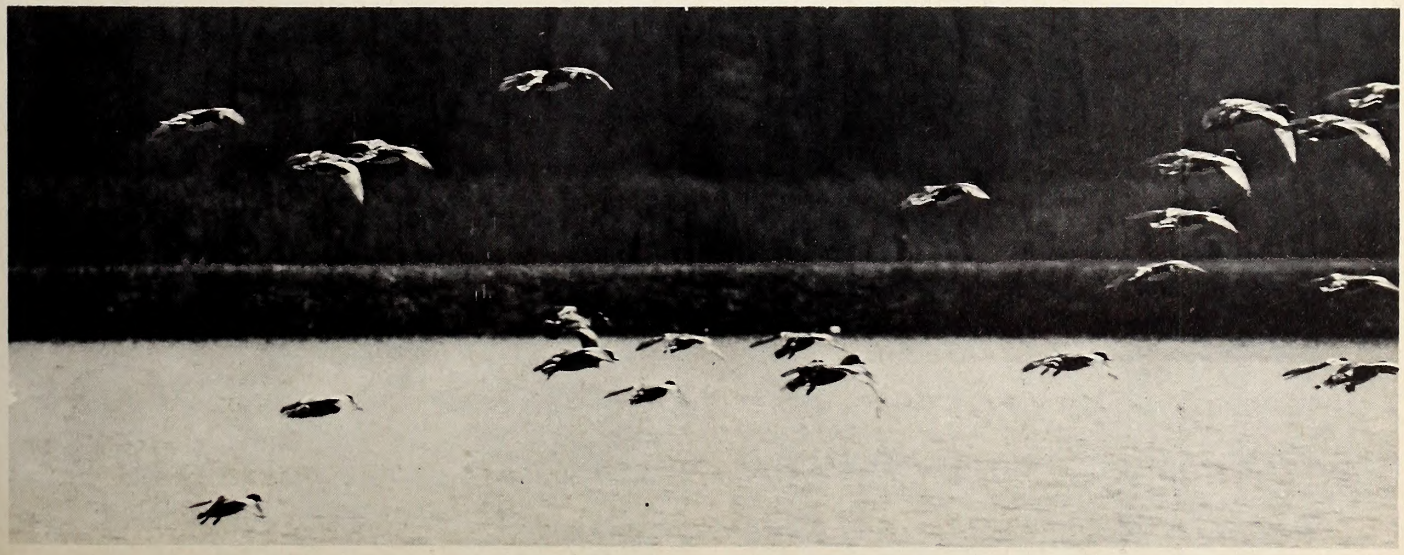
Attach sanded heads to bodies with dowel; use plenty of glue. Vary the position of heads. The plywood tail is glued into a slit in cork body. Fill any holes with plastic wood. Attach keels with counter-sunk brass screws. After glue has dried thoroughly, sand entire decoy and prepare for painting.



Cast lead anchor and ballast weights with plaster of paris molds using copper wire. Attach line to anchor with a brass ring. Tie anchor line through keel hole. A brass screw imbedded in ballast weight will help attach it to keel.
Use at least two coats of flat exterior paint over entire decoy. Use acrylic paints to match the bird's colors. Use a field guide for patterns, etc. Eyes can be carefully fastened with plastic wood. And you're ready to test.







Coastal Environments

by Dr. Thomas Linton and Dr. Arthur Cooper
N. C. Dept. of Conservation and Development
Photos from Dept. of Conservation and Development

This two-part article is from a paper presented at the 32nd annual meeting of the Association of Southeastern Biologists. Dr. Linton is Commissioner, Division of Commercial and Sports Fisheries; Dr. Cooper is Deputy Director, Department of Conservation and Development.

THE estuarine ecosystem actually has three major components: (1) the biophysical environment—the natural components; (2) the socioeconomic environment—the human use components; and (3) the institutional environment—the man-made controlling components.

The natural component is regulated first by the laws of nature. When the human use component is superimposed upon the natural component it can only be controlled through the institutional environment, the third component in the estuarine ecosystem.

Natural Environment

From the standpoint of its biophysical components, the estuarine ecosystem was first discovered in the early 1950's through the efforts of Professor E. P. Odum of the University of Georgia. The role of the salt marsh in the estuarine ecosystem and its importance to coastal fisheries was brought to light. Dr. Odum and his colleagues have defined the gross attributes of the estuarine area. Research by others has provided detailed confirmation of the generalizations developed by the Georgia group. During the intervening 20 years, refinement of the data has been accomplished by intensified estuarine research throughout the United States and in many foreign countries.

The following statement was presented in the hearings on the estuarine area before the subcommittee on Fisheries and Wildlife Conservation to the House Committee on Merchant Marine and Fisheries, 90th Congress First Session, and summarized the biological "value" of estuaries. "The estuarine complex is generally very fertile and production of plant and animal life is more productive, in general, than either land or sea. This is due in large measure to the dynamics of the tidal cycles, which mix freshwater with its burden of materials from the land—all too often humus and the best topsoil—with the mineral rich sea water and the organic products of underwater decay that are not allowed to stay settled on the bottom.

"Thus a sort of constantly disturbed rich broth is provided in a sheltered environment for small and microscopic plant and animal plankton to form the abundant food for successively higher links in the food chains that make up a web of life. The result is phenomenal. Perhaps two-thirds of all coastal sport fish are estuarine dependent during part of their lives.

"Some single estuaries are the spawning grounds, nurseries, or growing-up places for two dozen or more species of commercially important shellfish, crustaceans, and fin fishes."

This, in general terms, describes the biophysical environment which, in its unaltered state, exists as a balanced, self-regulating system.

Human Use Environment

When the activities of man are superimposed upon this natural environment, a second component comes into play. This is the socioeconomic environment, or the human use component. The estuarine area is plagued by pollution problems as are all other areas of the country. But there are additional human use components in the coastal area which have far reaching, detrimental effects. These are the gross physical alterations produced by man which result in a reduction in area of estuarine marshes and open water.

In 1967, the U.S. Fish and Wildlife Service tabulated the 20 years loss of estuarine fish and wild-

Dredging and filling constitute major areas of concern along our coast. Serious environmental damage can result from improper operations of this sort. Here, a retaining wall has been constructed to keep the dredged material from overrunning the surrounding marsh area.

life habitat along the ocean coasts and Great Lakes' shores. These estimates showed that, during this period, more than seven percent of the total area of this important habitat had been destroyed by dredging and filling. The high percentages of habitat destroyed were 67 percent in California, 15 percent in New York, 13.1 percent in New Jersey, 10.3 percent in Connecticut, and 10 percent in New Hampshire.

The damage and destruction that has occurred in the estuarine areas along the U.S. East Coast, is in seven major areas. These are: (1) dredging and filling in coastal waters and dune destruction on shorelines for housing, industry, and transportation, (2) increased entry of domestic and industrial effluents in the coastal waters, (3) mining, (4) solid waste disposal, (5) insect control activities, (6) water development programs and (7) upstream activities. Methods of controlling these damages to the estuarine area are being developed through the institutional environment.

The Institutional Environment

The 1899 Rivers and Harbors Act, which governs the activities of the U.S. Army Corps of Engineers, has provided the mechanism for controlling dredging and filling in coastal waters. The 1899 Act also provided a means for controlling the entry of pollutants into the waterways of coastal waters although this was not widely known until recently. The same Act can apply to mining. Solid waste disposal and insect control activities are generally carried out for the public good, but may or may not have controlling devices in the statutory authority which established them. Water development legislation also has built-in control mechanisms hopefully insuring that these developments be conducted in a manner not detrimental to the estuarine area.

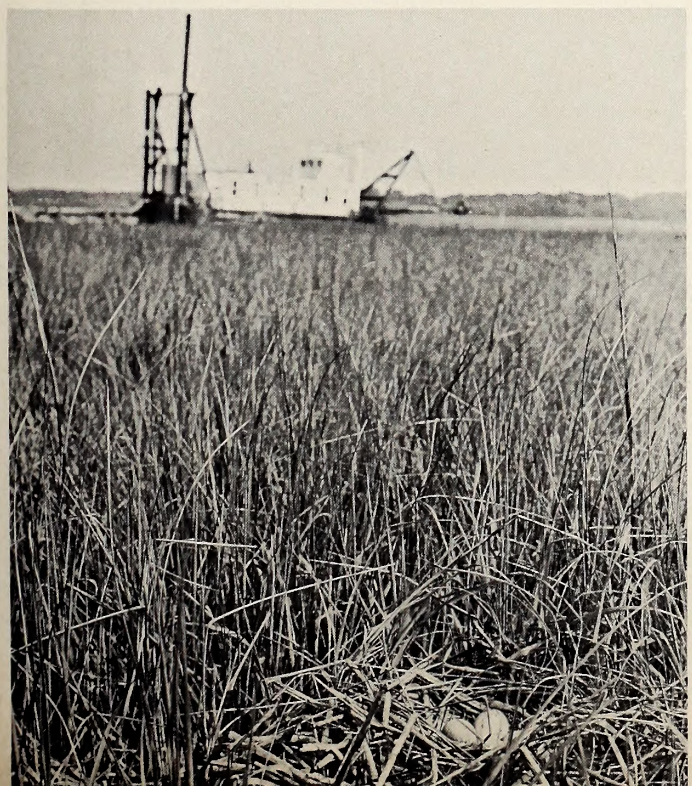
Upstream activities are more nebulous and probably the most difficult force with which to come to grips. Although these may be subtle changes, they may well have the greatest long range effect of all the seven major areas listed. Upstream activities consist of entry of agricultural fertilizers into waterways, entry of pesticides sprayed on agricultural crops, runoff from intensified agricultural activities (feed lots, etc.), and increased silt loads from poorly conducted highway building operations and poorly conducted housing developments. It has been reported that silt is the major pollutant present in the surface waters of the United States.

In 1965, California, through an act of its legislature, created the San Francisco Bay Conservation and Development Commission. This Commission was directed to study the bay. To protect the bay during the planning period, a permit to conduct dredging and/or filling had to be obtained from the Commission. Other states that have methods whereby dredging and/or filling can be controlled are Connecticut, Florida, Maine, North Carolina, Louisiana, and Texas.

State marsh land acquisition programs are underway in New Jersey, New York, and North Carolina. These programs are attempting to reduce the problem of habitat loss by bringing into public ownership areas deemed to be needed for the continuation of a healthy estuarine fishery.

Another method for protecting estuaries, instituted at the State level, is a rule-making approach such

A thriving, productive marsh with its important living community can soon become a barren, sterile sand flat, never again to serve its purpose as a living area for marsh creatures and as a buffer between sea and land.



as has been adopted by Massachusetts. Through statutory authorization, the Commissioner of Natural Resources, with the approval of the Board of Natural Resources, may adopt regulations concerning alteration or pollution of coastal wetlands. If these regulations are found in court to constitute taking of property without just compensation, the Department may proceed to condemn the land through its powers of eminent domain. This legislation was enacted after extensive studies and reports. The Department of Natural Resources regards the rule-making authority as the most promising approach to control of estuarine destruction. It permits the Department to work on a regional basis to preserve wetlands without waiting for actual development commitment. Under this law, the Department has established protection covering 8,000 acres on the north shore of Massachusetts administered by the Department of Natural Resources. This rule-making authority has not been tested in the courts of Massachusetts at this time.

If There Are Controls, Why The Problem?

The question that obviously arises is that since controls exist, why do we have problems of such magnitude? With control there must be enforcement and it must go hand in hand and receive equal emphasis. The full contents of the 1899 Rivers and Harbors Act have not been enforced. All of the control components of water development acts and legislation have not been enforced. Pollution control laws which should govern upstream activities have not been enforced.

There is, however, an indication of a reversal in this trend. As a result of research and development activities by various federal and state programs and study commissions, the value of this area has been documented. The detrimental effects resulting from human use have been isolated. An increased activity and movement toward greater exertion of man-made controlling components is in full swing at the federal, state, and local levels of government.

Digging and Filling In Estuaries

In 1969, the North Carolina General Assembly enacted G.S. 113-229 which provides that, "before any excavation or filling project is begun in any estuarine water, tidelands, marshlands, or state-owned lakes, the party or parties desiring to do such shall first obtain a permit from the North Carolina Department of Conservation and Development." This law was enacted to counter the problem of indiscriminate filling and excavation of marshlands along the coast. It requires any person, firm, or corporation prior to beginning any work in the coastal areas to make application to the State for a permit to authorize the project. This does not necessarily prohibit all work in marshlands and estuarine waters but does give the State an opportunity to examine the proposed project, and to grant, deny, or modify a permit before the project begins.

This is far more power than the State had prior to 1969 when anyone could dredge almost at will in the waters and marshlands of the State. Of course, a U.S. Army Corps of Engineers permit was required, and the Corps did give the State the opportunity to comment on a federal project. However, the Corps' jurisdiction is restricted to navigable waters only. Thus, dredge or fill projects in non-navigable waters and in marshes were subject to neither federal nor state control.

There are several problems associated with the present North Carolina dredge and/or fill law. First, it is too piecemeal. This is because each application must be considered individually and considerable time and money must be expended by both the State and private citizens to deal with this problem. Second, at the present time, there is no accurate inventory of the resources in the 2.2 million acres of North Carolina's estuarine lands. Finally, the law calls for the Department to make a ruling as to whether the proposed modifications are in the public interest. The North Carolina Supreme Court has recently ruled that only the General Assembly can determine what is or is not in the public interest. Our legislature is currently considering a rewording of the law to repair this flaw.*

In 1969, the General Assembly directed the Commissioner of the Division of Commercial and Sports Fisheries to develop a comprehensive study of the estuaries of North Carolina. The study would form the basis for the preparation of a comprehensive and enforceable plan for the conservation of the resources of the estuaries, the development of their shorelines, and the use of the coastal zone of North Carolina. It will be a plan into which the various biophysical, socioeconomic, and institutional components of the estuarine ecosystem may be fitted. Such a framework will allow the weighing of one demand on the estuarine zone against another and will alleviate the piecemeal, case-by-case making of decisions. The study should be completed in 1972.

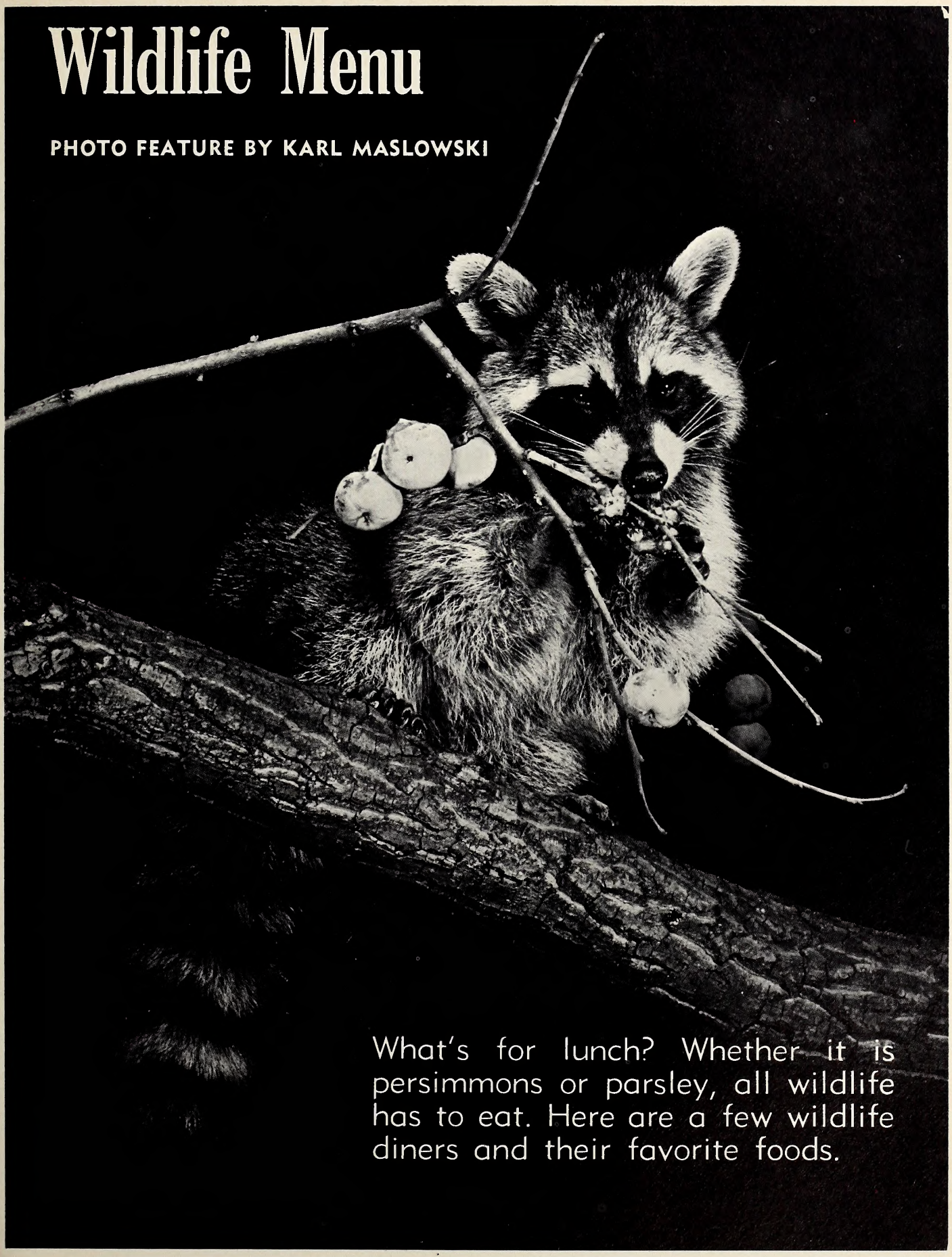
As indicated, the State of Massachusetts passed a dredge and fill law in 1963. Through their experiences, they determined their law, also, was too piecemeal. Thus, in 1965 they enacted a law giving the Department of Natural Resources the authority to issue, upon the approval of the Board of the Department of Natural Resources, an order which would regulate, restrict, or prohibit dredging, filling, removing or otherwise altering coastal wetlands.

Legislation has been introduced in this session of the General Assembly, to authorize a similar authority for North Carolina. If enacted, this will give us the necessary authority and controls to consider on a coast-wide basis the effects of dredge and/or fill operations.*

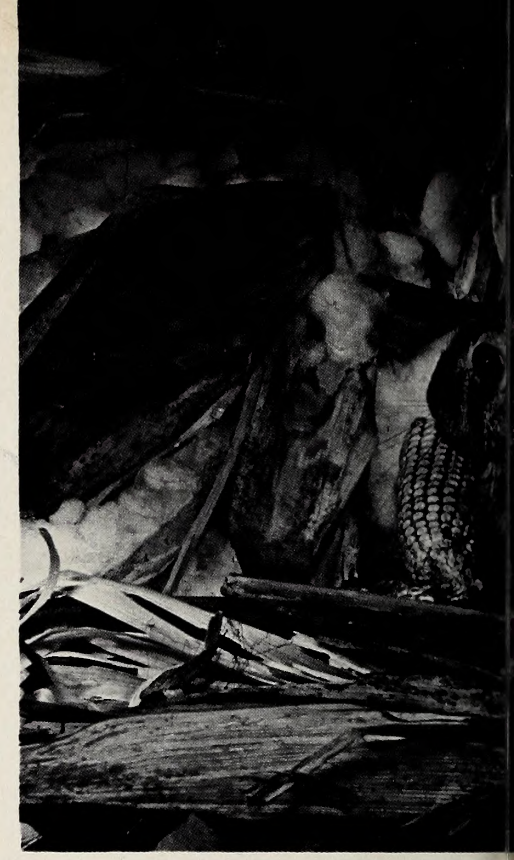
*This speech was delivered before the 1971 Legislature adjourned. The legislation in question was enacted.

Wildlife Menu

PHOTO FEATURE BY KARL MASLOWSKI



What's for lunch? Whether it is persimmons or parsley, all wildlife has to eat. Here are a few wildlife diners and their favorite foods.



The smaller creatures of woods and fields may
up on the menu rather than partaking of it. T
white-footed mouse (left) is eating wild che
including the seed! Corn on the cob make
winter meal for this cottontail. Waste grains
wildlife survive. A little stream provides
raccoon with a tasty frog (below), and he doe
seem to mind getting his tail wet.

Wildlife Menu

The predators of the air, the hawks and owls, are excellent hunters and often have a bad reputation for taking chickens, game and even livestock. Actually they very likely do mankind a great service in keeping a check on the small rodents. This red-tailed hawk has a Norway rat in its powerful talons.

Elizabeth City—Fisherman's Paradise

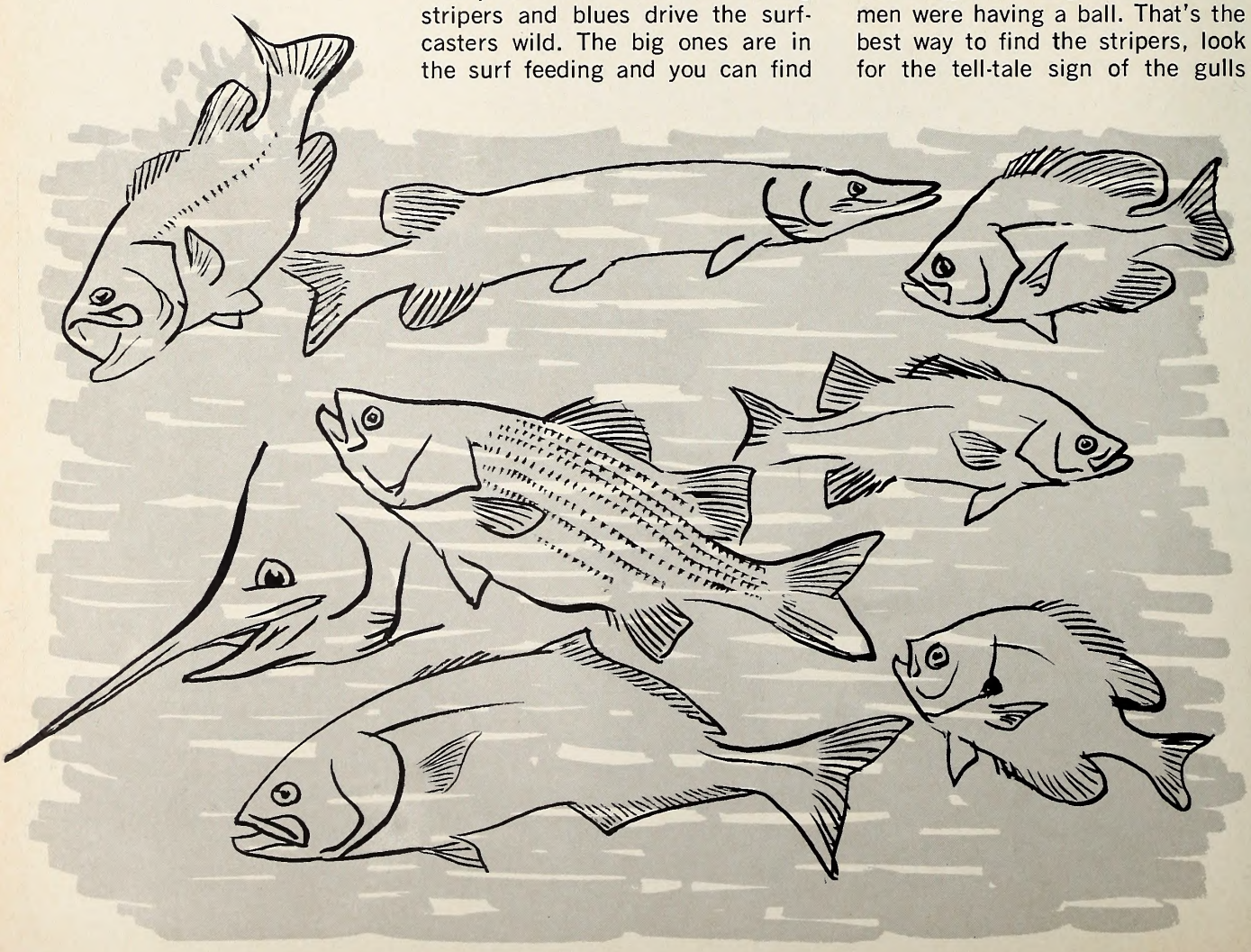
by Jerry Allen
Elizabeth City

If you want to sample some of this great fishing, and maybe win a prize too, write Jerry Allen, 401 Harney St., Elizabeth City, N. C. 27909, about the October 16-17 Striped Bass Derby.

It's not a big town, only about 14,000 fine people, located some forty miles below Norfolk, Virginia and about the same distance from North Carolina's famed outer banks which the Wright brothers made famous with their flying machine. Actually, it's sort of stuffed up in the northeastern corner of the state along with the Currituck Sound, Albemarle Sound, and several rivers that offer exciting moments for any man that has ever wet a hook. No, not too big, but yet big enough to have commercial airline facilities which makes it accessible to sportsmen from all over the country.

Many writers enjoy slow beginnings and quick, spine-tingling finishes to stories regarding fishing. This is practically impossible when writing about the Elizabeth City area since there is no "slow" time of the year when it comes to fishing. They are always ready to bite in some place or other within an hour's drive of Elizabeth City. For example, in late December, the big stripers and blues drive the surf-casters wild. The big ones are in the surf feeding and you can find excited fishermen from Oregon Inlet to Cape Point on Hatteras Island. Blues weighing 23 pounds are taking the baits and stripers up to 57 pounds have been landed in this late fall blitz on the outer banks. One morning last year I counted seven men that had big ones hooked at the same time. Four were landed averaging about thirty pounds each. Twelve year olds have landed forty pounders while some old salts looked on in amazement. Elbow room is the name of the game when a school moves into the surf. Beach buggies, jeeps, automobiles with over-sized tires, and everything else converges on the spot in a matter of seconds. Fun? What an understatement.

Back in town a few weeks before that, it was not unusual to count thirty boats at any given time in the Albemarle Sound. Those are the ones within sight of you. Imagine how many are out there that you can not see. The stripers were schooling and the gulls and fishermen were having a ball. That's the best way to find the stripers, look for the tell-tale sign of the gulls



working over a school and head for it. It is not unusual to count as many as ten schools at one time in the sound. The gulls are everywhere collecting their dinner as the stripers rip through schools of small herring leaving bits and pieces of them scattered on the water.

Usually a Hopkins will keep you as busy as anyone would care to be when stripers turn the surface to white foam as they slash into school after school of bait. A Hopkins is shaped sort of like a small herring but is stainless steel with indentations on the sides that apparently resemble scales when it is moving through the water. They are made in Norfolk, Virginia and I am sure the company has sold millions of them since they will catch stripers in the surf, sound, or anywhere else you can find them. Too, they will do just as well with the blues, speckled trout, grey trout, white perch, flounder, and several other species. At least that is what has been caught on them in this area. There are many fishermen with years of experience here that feel absolutely secure in going out with just a couple of Hopkins', a Rebel, and maybe a couple of Hotspots.

It's nothing unusual for a fisherman to catch one to two hundred pounds of stripers in an afternoon when they are schooling. In fact, some of the fellows have brought in four hundred pounds after a day in the Albemarle Sound. These men were jigging that Hopkins lure off the bottom or casting it into the schools.

The stripers hang around all winter in the rivers and sound. As most know, the Albemarle Sound is second only to the Chesapeake Bay regarding striper population. A couple of days before 1971 entered, a school was spotted right down town and one lucky sportsman found himself in the middle of them. Even though the temperature was in the low 30's, he caught them until his hands were so cold he could not hold the rod. That's the way they are, popping up here and then again, five miles from where you last saw them feeding the day before.

If your luck runs sour a few days in succession, you can always go further up the Pasquotank River or one of the many others in the area with a couple dozen minnows and a cane pole and have a lot of fun with the speckled perch. Folks here call them crappie and really enjoy the sport in challenging them in deep water with the live minnows. During the worst of the winter, which is not really bad in this area, the rock seem to hang around pilings, old piers, and stumps along the banks of the river. Rebels are used quite successfully in enticing them to hit. Usually the Rebels are cast into or over the stumps and underwater obstacles and retrieved rather quickly, often challenging the stripers to come up after it. When they do, you will feel as if you have hooked the stump itself, but hang on and get ready for a fight.

Early in the year, the herring start their run up the rivers and creeks to deposit the millions of eggs they are carrying. Many sportsmen have a lot of fun catching them in large wire baskets in the creeks but it seems somewhat tragic since the fry hatched from the eggs bring the stripers back to life. Anyway, many folks will tell you there is nothing that will beat a herring fried brown and crisp where you can eat bones and all.

The white perch begin schooling about spring or a little after. Usually they are congregated in an area of the sound so thick that all you have to do is toss your bait overboard. Last year they were in the lower part of the sound down around Edenton. You could see acres of them feeding at times and it was nothing unusual to catch two or three hundred as fast as you could bring them in. They give you a fine fight on light tackle and too, they are very delicious when put on the table for supper. The perch feed in much the same manner as the stripers and the gulls will show you the fish if you keep an eye out for them.

Combined with the perch, largemouth bass, and stripers that seem to always be around, the summer is quite busy for the sportsman. This is not to mention the sports-fishing fleet that works out of Oregon Inlet every day. Marlin is the thing and surely every man that has wet a hook knows of the fantastic fishing off the North Carolina coast. It has been said that any person who went out from Oregon Inlet and did not bring in fish must have been seasick. Again, I will not verify this because I am sure there is someone somewhere that had a bad day. Too, I don't feel that it would be fair to our fine captains at Oregon Inlet to be subjected to a statement such as that. Rest assured of one thing, the captains are just as concerned about you catching fish as you are. They want you to return and if you catch the big ones, you will probably be back, right?

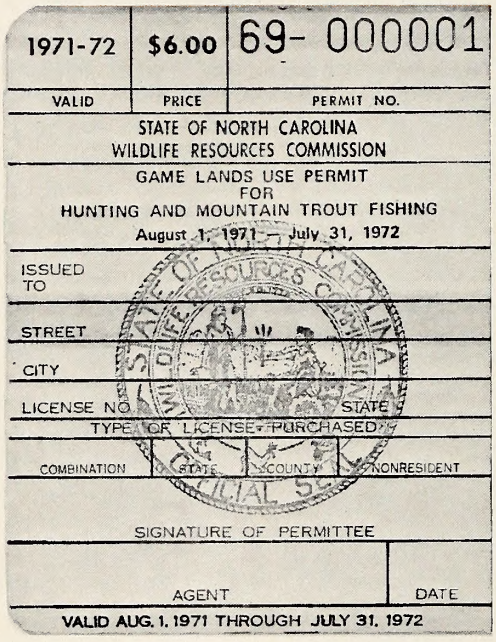
The fall of 1970 was startling. Even speckled trout, blues, grey trout and other species found their way into the Albemarle Sound where the sportsmen with small boats were having a ball.

That seems to be the way it is in the Elizabeth City area year round. You will think the fishing is over for awhile and someone will say, "hey, the rock are hitting in North River" and away you go. Too, most of the year you can pull the big bass out of the famous Currituck Sound weed beds. What a fabulous area for the largemouth. Folks from hundreds of miles away come just to fish Currituck.

With such great fishing and fine weather almost year round, the area is becoming more and more attractive to the sportsman. Many are buying lots in one of the many developments in the vicinity with hopes of retiring to full-time fishing before long. You really can't blame them. You just can't beat trout for breakfast, shrimp for lunch and a bushel of steamed oysters for supper. All are available and plentiful in the Elizabeth City area, where the action does not slow during any time of the year.

This article is not solely for the purpose of promoting Elizabeth City. It is written in truth about the entire area. Since Elizabeth City is the "hub of the area" with commercial air facilities and other conveniences fishermen appreciate, it seems fitting that it would be a central operating point for visiting sportsmen. ◆

Questions and Answers About the New GAME LANDS USE PERMIT



1971-72	$6.00	69- 000001
VALID	PRICE	PERMIT NO.

STATE OF NORTH CAROLINA
WILDLIFE RESOURCES COMMISSION

GAME LANDS USE PERMIT
FOR
HUNTING AND MOUNTAIN TROUT FISHING
August 1, 1971 — July 31, 1972

ISSUED TO

STREET

CITY

LICENSE NO. STATE

TYPE OF LICENSE PURCHASED

COMBINATION STATE COUNTY NONRESIDENT

SIGNATURE OF PERMITTEE

AGENT DATE

VALID AUG. 1, 1971 THROUGH JULY 31, 1972

PHOTO BY LUTHER PARTIN

WHEN the North Carolina Wildlife Resources Commission decided last June to take on management of over one million acres of new game lands, it also initiated a greatly simplified licensing system. The key to the new system is the Game Lands Use Permit. This new permit, along with the sweeping expansion of Game Lands, was bound to raise a lot of questions from those whom it will affect most, the hunters and fishermen of North Carolina. In fact, we already have received numerous inquiries about the new licenses and, in anticipation of more of the same, we have compiled a list of frequently asked questions, along with their answers about the Game Lands Use Permit.

1. **Where can I buy a Game Lands Use Permit?**
   The Game Lands Use Permit can be obtained from any authorized hunting and fishing license agent. It should be noted that permits will not be available for purchase on Game Lands as checking stations will not be in operation.
2. **How much will the permit cost?**
   $6.00.
3. **When does it go into effect?**
   The Game Lands Use Permit became effective August 1, 1971.
4. **Where am I required to have this permit?**
   As its name indicates, the Game Lands Use Permit is required only on Game Lands (including Dove Areas) managed by the Wildlife Resources Commission. This includes, of course, the old "management areas" as well as all U. S. Forest Service lands and lands leased from private owners for the purpose of game management.
5. **What other licenses do I need?**
   The Game Lands Use Permit is required in addition to the necessary hunting and fishing licenses. It does not take the place of the Special Big Game Hunting License required for hunting deer, bear, wild boar, and turkey. Those persons hunting for these species on Game Lands are required to have the Game Lands Use Permit and the Big Game License as well as the regular hunting license.
6. **Is the permit valid for fishing as well as hunting on the Game Lands?**
   Yes, on those Game Lands where fishing permits are required.
7. **Does the introduction of the Game Lands Use Permit mean that the fishing permits I now hold are no longer valid?**
   No. Where it applies to fishing, the permit can be used in lieu of (but is not required in addition to) the fishing permits for "management areas" as specified on page 33 of the 1971 North Carolina Inland Fishing

Regulations. For the remainder of 1971, no Game Lands Use Permit is required to fish on Game Lands lying outside the "management areas" designated in the Inland Fishing Regulations. Fishing regulations for the period starting January 1, 1972, are still in the process of being formulated.

8. **What species will I be allowed to hunt on this new permit?**

Any species for which the season is open in the area where the Game Land concerned is located. Hunters should note that Commission-managed Dove Hunting Areas are classed as Game Lands on which the Game Lands Use Permit is required.

9. **How will I use the big game tags that are attached to the new permit?**

Immediately after a hunter takes any of the designated big game species on a Game Land, he is required to attach the appropriate tag to the carcass. He must also indicate the date of the kill on the appropriate tag and make sure it is securely attached. Only after he has fulfilled these requirements is a hunter allowed to transport the carcass. The tags must remain attached to the carcass until it is dismembered or prepared for consumption.

The reasons for the big game tagging system are manifold. First, the tagging system will facilitate the enforcement of game bag limits at mobile checkpoints within the areas. At the same time, scientific data as to the size and physical condition of various game populations will be collected at these checkpoints to serve as controls for future game management. The postcards accompanying the game tags also are a game management tool. It is hoped they will provide an accurate count of the number of animals killed thereby aiding Commission biologists in determining future management needs of the various species.

10. **Isn't $6.00 a lot of money for a permit just to hunt on state-managed lands?**

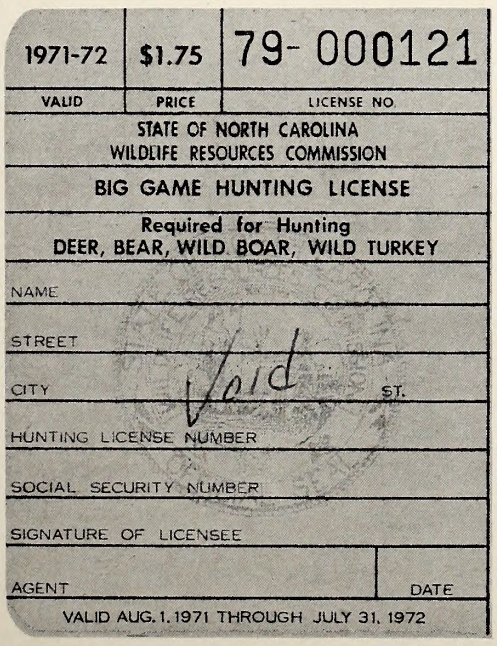
In the long run, the new Game Lands Use Permit will represent considerable savings for most hunters who use Commission-managed lands. In effect, the permit eliminates all former special hunt permits, including the $4.00 daily permit and the $5.50 Small Game Season Permit previously required on the Game Lands. The trout fisherman will realize the greatest saving through the discontinuation of the $1.75 daily permit and $15.50 season fishing permit that have been required on western Game Lands. Further, the increased posting of private land and the growing cost of leasing land and belonging to a hunt club, have squeezed some hunters out of a place to hunt. Now, under the expanded Game Lands program, North Carolina's sportsmen will have nearly two million acres of land to hunt and fish at a very minimal cost.

11. **What days of the week will the Game Lands be open for hunting?**

The Game Lands will be open six days a week except for some of the lands where hunting will be limited to three days per week. (See pages 20-23 of the 1971-1972 North Carolina Hunting and Trapping Regulations.) Bears may not be taken at any time on posted bear sanctuaries and wild boar may not be taken with dogs on such sanctuaries. Dogs may not be used for any hunting on the western Game Lands during the open deer season.

12. **How can I find these new Game Lands?**

A book of maps showing the locations of the various Game Lands is now available free of charge from your authorized hunting and fishing license agent or copies may be obtained by writing: North Carolina Wildlife Resources Commission, Game Lands Maps, P. O. Box 2919, Raleigh, North Carolina 27602. ◆



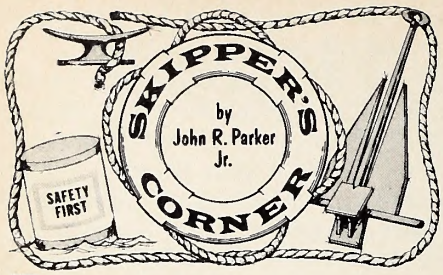
Big Game Hunters Need Special License

Hunters who plan to hunt big game — deer, bear, wild boar or wild turkeys — anywhere in North Carolina during the 1971-1972 hunting season will need a $1.75 Special Big Game License in addition to any other required licenses or permits.

These Special Big Game Licenses are required both on and off the N. C. Wildlife Resources Commission's managed Game Lands.

Hunters who plan to hunt on the Wildlife Commission's Game Lands — either for small or big game — will also need one of the new $6 season Game Lands Use Permits. Attached to the Game Lands Use Permit are big game tags. These tags DO NOT take the place of the Special Big Game Hunting License, and hunters who plan to hunt big game on the Game Lands are cautioned to be sure they have both a valid Special Big Game License ($1.75) and a valid season Game Lands Use Permit with attached big game tags ($6.00).

The tags which are furnished with the Game Lands Use Permit are designed only to help Wildlife Commission personnel check kills and more efficiently manage big game populations on Game Lands. ◆



BOATING news that has been in the making for several years was moved into the spotlight this past summer by a certain signature. On August 11, President Nixon signed into law the Federal Boating Act of 1971. Passage of the Act is probably the most significiant boating news since the Federal Boating Act of 1958 and deep-vee hulls. The 1958 Act was the thing that made many people realize that there were in fact boating problems, laws, etc.

We can assume that Congress and the President are happy with the new Act. The Commandant said the U. S. Coast Guard is happy with it. And from this Corner, I have heard no real complaints from the Nation's boating law administrators.

Basically the Act provides for the numbering of all undocumented vessels equipped with a motor; gives the Coast Guard authority to establish minimum safety contruction standards for boats and associated equipment; provides uniformity for individual state boating safety programs; authorizes financial assistance to the states and directs that a Boating Safety Advisory Council be established.

Perhaps in reading over the brief offering on what the new Act covers you stopped after the first "provides for" and said to yourself "that means I'll have to register my little 10 hp (or under) fishing boat. That is what it means, but don't rush out and try to do it right away. Remember the State's General Assembly won't meet again until 1973; that is when our lawmakers will take up the subject.

What about registering those small craft? Well, here is the way I view the subject: First, many states have for years been registering the smaller power boats. Some states even register sailboats, and rowboats, the works. So this approach is not new. When the North Carolina General Assembly responded to the 1958 Act, they elected to enact a law with an over-10 horsepower requirement for registration, the minimum suggested by the Federal Act. Many other states did this initially but over the past 12 years many have moved to include additional vessels. And I might add they did so with good reason.

Perhaps I can explain that statement with some simple "what's fair is fair" logic. The boats that are most often involved in fatal accidents are—you guessed it, those small, small-craft that are not presently registered in this state. This means that those to whom the state's boating safety program could offer the most are not contributing to the program (financially).

Here, in brief, are a few highlights on the various provisos. The Advisory Council will be composed of representatives of industry, state government, boating organizations and the general public. Safety standards to be followed by manufacturers will not be arbitrary standards but will be documented, including a statistical analysis of accidents and search and rescue assistance cases or from an engineering evaluation which identifies a hazard before it results in a statistic. Boats and associated equipment built prior to the effective date of any standard will, in general, not be required to meet that standard unless substantial risk of personal injury is involved.

The present figure mentioned for financial assistance to the state is seven and one-half million dollars. Also worthy of mention at this time is that the new Act provides that any person who renders assistance at the scene of a vessel accident will not be liable for any civil damages as a result of the rendering assistance where the assisting person acts as an ordinary or reasonably prudent man would have acted under the same or similar circumstances. Finally, throughout the Act uniformity among the states is either required or urged. There will be more from this Corner in the future on the new Federal Act and associated happenings from the State scene. And we would hope that what has been signed by the President and what will be coming before North Carolina lawmakers and her Governor is as good as Admiral Bender suggests when he said the Act "gives the people of this nation one of the best boating safety laws ever written, specially designed for the protection of human lives and property." ⬍⬍

The small "small-craft" are often the ones that contribute to boating accidents, yet presently don't come under the boat registration phase of the North Carolina Boating Act. The new Federal Boating Act is aimed at, among other things, correcting this.

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Public Hearings on 1972 Fishing Rules

Following long-established policy, the Wildlife Resources Commission has scheduled three public hearings to give fresh water anglers a voice in setting the 1972 rules for fishing in inland waters. Dates, places and hours are:

October 4, 1971	Asheville	Courthouse	7:30 p.m.
October 6, 1971	Salisbury	Courthouse	7:30 p.m.
October 7, 1971	Washington	Agriculture Aud.	7:30 p.m.

Proposed regulations were considered by the Commission at its September 26 meeting. Official regulations will be set November 1.

Another Retriever Trial Scheduled

Lake Mattamuskeet will again be the scene of the Second Annual AKC sanctioned Retriever Trial October 30 and 31. The trial will be sponsored by the East Carolina Retriever Club. For details, contact the Club's President Dr. J. M. DuBose, Box 1208, Kinston, N. C. 28501.

Waterfowl Regulations?

The U. S. Bureau of Sport Fisheries and Wildlife and the N. C. Wildlife Resources Commission are hoping Tarheel newspapers will cooperate in providing information on migratory game bird hunting regulations for the upcoming season. A shortage of federal funds prohibited the publication of rules on waterfowl and other migratory game birds for distribution by U. S. Post Offices.

A synopsis of the dates, bag limits, and shooting hours for migratory game birds will be printed in the November issue, and similar information will be sent to all N. C. Newspapers.

McDowell Heads OWAA

Bodie McDowell, North Carolina's only full time outdoor writer, has been elected president of the prestigious Outdoor Writers Association of America. McDowell, who writes for the Greensboro Daily News, has been active in OWAA affairs for a number of years.

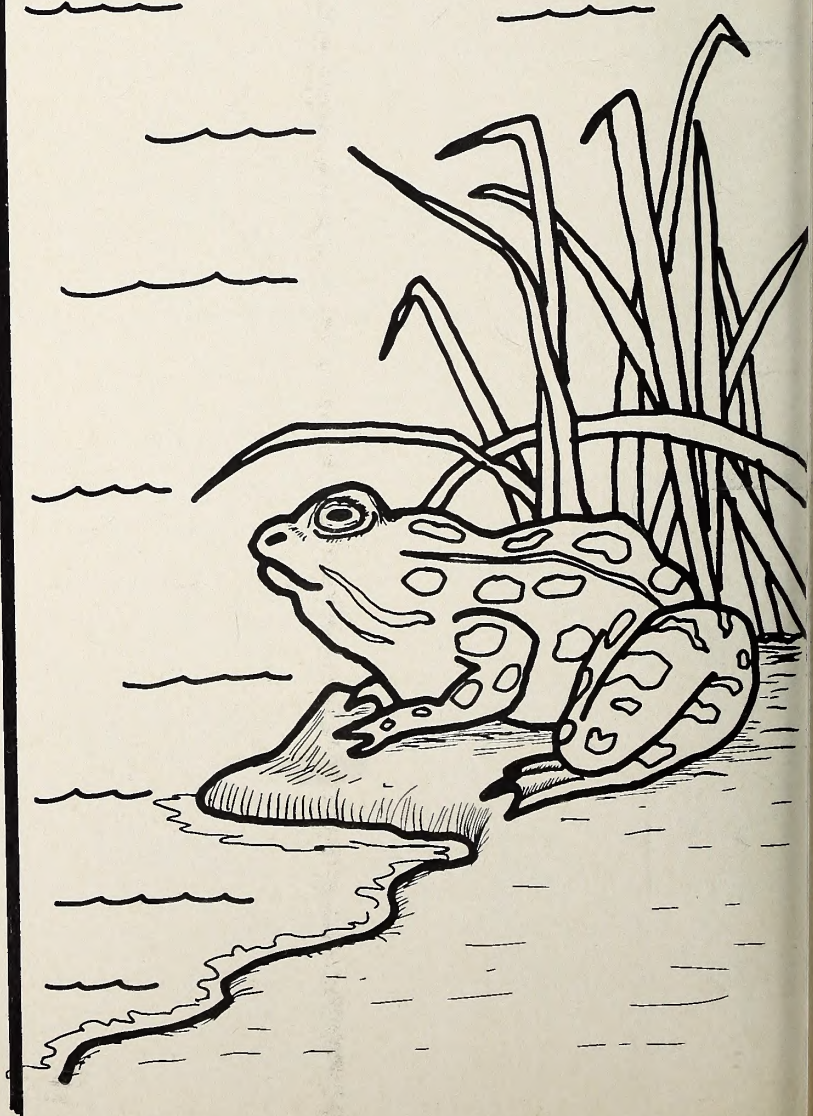
THE MOST LOGICAL FROG ©

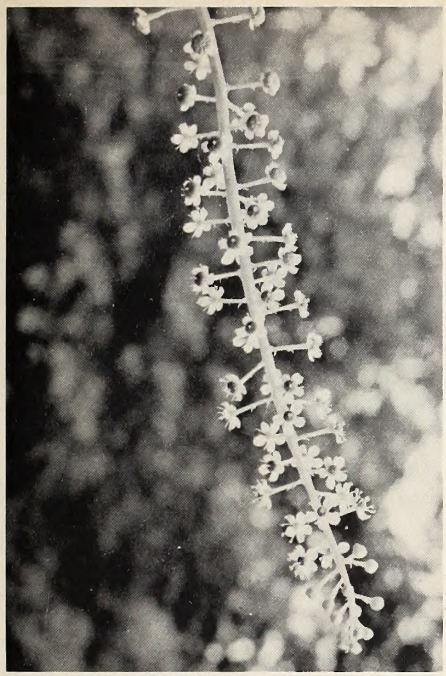
by
JANE & DERRY WALKER

HI, BOYS AND GIRLS:
I'M LOGICAL FROG AND THIS IS MY SISTER. HER NAME IS PROBABLE. WE FROGS USUALLY HAVE DRAB GREEN OR BROWN SKINS. FROGS HAVE SMOOTH SKINS. TOADS HAVE WARTY SKINS. WE EAT INSECTS, SNAILS AND CRAYFISH. WE HIBERNATE IN THE WINTER ON THE BOTTOMS OF LAKES AND STREAMS.
I WAS ONCE A POLLYWOG! DO YOU KNOW WHAT A POLLYWOG IS?*

L.F.

*TADPOLE





Pokeweed: Food For Wildlife

Our back cover this month features Michael Godfrey's color photos of this interesting plant, the pokeweed.

by Michael A. Godfrey
Hillsborough

"DON'T hang out your wash in pokeberry time", goes the old adage. More than just a caution against having the household linens decorated with purple, it signifies in a folksy way the tremendous importance of pokeweed as a food source for birds. If the mammals could fly it would apply to many of them as well.

Unlike most of our weeds (botanists define a weed as a plant which grows vigorously with or without human management) poke is a native North American plant. Its scientific name is **Phytolacca americana.** In fact, North Carolina is just about in the center of its natural range. Europeans discovered the plant only after colonizing here. It wasn't long, however, before a mistique developed about the powerful medicinal qualities and strange growing habits of pokeweed earning the plant a place in the folklore and imaginations of people the world over.

By 1650 poke had been successfully introduced in southern Europe for use as a dye in cheap wines. The nobility objected and launched the first campaign to eradicate the plant. Their effort met with no greater success than do present attempts. By 1850 American biblical scholars speculated that the Hyssop and the Mustard of the Bible were actually pokeweed. Well into this century Americans of all races applied various parts of the poke plant as cures for almost every conceivable ailment including cancer, syphillis, ulcers, hemorrhoids, rabies, obesity, ringworm, corns, and the seven-year itch.

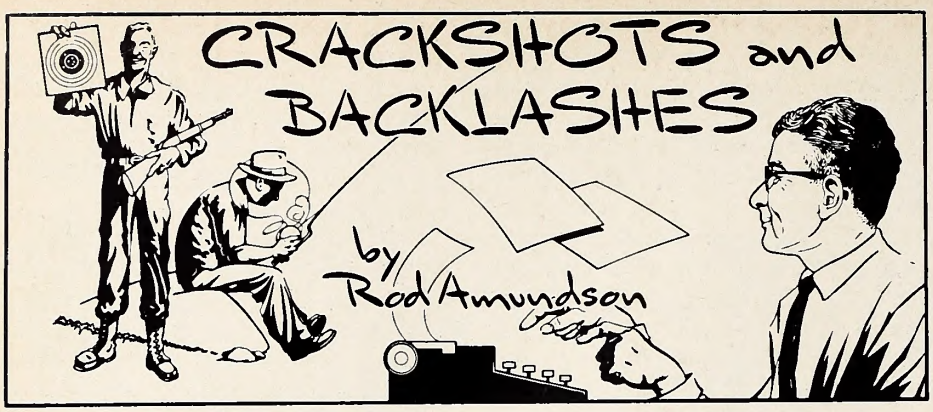
In modern times the most popular application of poke is as a table vegetable. Agronomists in Arkansas are experimenting with large-scale cultivations of table grade poke, and herb gardeners have successfully cultivated it for years. The leaves and tender young stalks of the plant up to eighteen inches high can be boiled and served like spinach and asparagus, respectively. Care must be taken to cut the stalks well above the root since the underground portions are poisonous. Even the above-ground parts are said to become mildly toxic as the plant matures, so prudence dictates using only the young shoots. But don't let the "poison" scare you off. Some parts of many of the plants in your vegetable garden are toxic to some extent. Poke "sallet" is a flavorful spring green worthy of its place in Tarheel tradition, and anyone who tells you otherwise hasn't tried it.

Much of the mystery of pokeweed can be explained in its natural history. Strangely, poke often appears after a soil disturbance in an area where it was previously absent. This is because the seed is highly viable. It can lie dormant in the soil for over fifty years after being chemically treated in the digestive tract of a bird or animal to germinate when conditions permit. Poke is rarely seen, for example, in mature forests. Soon after logging, however, it may carpet the area. Being a "pioneer" plant in disrupted areas, poke acts as a soil stabilizer as well as an important source of food for wildlife.

It is in the role of a wildlife food staple that poke excels. The berries begin to ripen in late summer and hang in purple profusion late enough to color the ice of winter with their frozen juice. While the berries are available, many forms of wildlife eat little else. Migratory birds benefit most notably. The ripening poke spreads a 1500 mile cafeteria before them as they move southward. Since the berries persist well into winter, even the tardy migrants find the going easier. Long after the black gum, dogwood, and privet berries have been devoured, the poke plant doggedly blooms and fruits. I have personally seen pokeberries being eaten by rose-breasted grosbeaks, robins, cardinals, cedar waxwings, several varieties of sparrows, bluebirds, bluejays, mockingbirds, and flickers as well as our noble game birds, the mourning dove and bobwhite quail.

Many mammals also are highly dependent on pokeberries in the autumn. Any woodsman can see the droppings of foxes, racoons, skunks, and opossums containing the seeds and skins of pokeberries. An Orange County dairy farmer who enjoys rabbit hunting told me he has often seen fox droppings composed entirely of pokeberries during the height of the hunting season. He feels as a result that poke helps reduce predator pressure on small game. Black bears are also fond of the berries as those who are fortunate enough to share the neighborhood with bears can attest.

The precise value of poke to our wildlife would be difficult to measure. Bird migration routes, the availability of other foods, and many other factors vary the significance of any one source. Still, any North Carolinian who savors his walks in the fields and clearings finds that the stalks which were laden with pokeberries in autumn stand naked in the winter winds. Something eats them all. ⬍⬍



The board of trustees of the Glass Container Manufacturers Institute, Inc. has adopted an official policy statement with respect to solid waste disposal and litter control. The document is believed to be the first of its kind ever to be adopted by a major packaging industry.

"Although glass containers constitute only a relatively small portion of the total solid waste and litter accumulation," said Richard L. Cheney, GCMI president, "their presence in the refuse mix cannot be ignored." For this reason, he said, the glass container industry "has accepted the responsibility to help develop more effective solid waste management and litter control systems and techniques."

The new policy statement, Mr. Cheney said, clearly defines the industry's position regarding land pollution and spells out GCMI's approach to combating litter and solid waste.

"We are convinced," he said, "that the only viable long-range solution to this problem is the salvage and recycling of most components of refuse, including glass containers. When refuse is separated, recycled and marketed by industry on an economically feasible basis, pollution from solid waste and litter will be practically eliminated."

Copies of the GCMI Environmental Policy Statement may be obtained by writing to Manager, Information Services, GCMI, 330 Madison Avenue, New York, N. Y., 10017.

Deer Price

It seems like Gates County deer just can't win when it comes to trying to get across the highway!

Late last summer, James Earl Umphlett of Eure was cruising along US 158 when a deer jumped out of the woods into his path. Wildlife Protector John Savage said there was nothing unusual in that, except that in the collision which followed, the deer was killed; it came out second best to the Honda that Umphlett was driving.

This tangle with a deer follows the incident in which three of four deer were struck and killed by a tractor trailer in the same vicinity a couple of months earlier.

Protector Savage said that Umphlett was not injured, but had a bad case of nerves when he described the incident shortly after the accident.

Bank Swallows

Dear Sir:

In your June 1971 "Wildlife" issue, there was an article entitled "Fish Hawk" written by Mrs. Mason Daniels. In this article it read, "In April, the bank swallows (also called purple martins) arrived and set up house-keeping . . ."

The statement could be misleading to readers; they might think the bank swallow and the purple martin were the same birds.

According to Peterson's Field Guide to Birds, these are not the same birds. The purple martin is a larger bird with different features.

Hank Lane
Rock Hill, S. C.

Groundhog Day

While hunting groundhogs near my home in Clay County during May of this year I captured a young groundhog. On returning home I placed the young fellow in a cardboard box in the trunk of my car. Upon arriving home, rather late at night, I discovered he had escaped from the box and upon searching with a flashlight I found him hiding back between the inside of the car and the wheel well. Being out of reach in such a small place I decided it was as good place as any for him to spend the night. I would take the matter up first thing in the morning.

Next morning I looked for him in this same place but could not see him. I unloaded the luggage and other items in the trunk so we could both have plenty of "op-

erating" room. I then straightened out a coat hanger and "searched" the hole with it. To my surprise I discovered the hole kept going after the length of my hanger ran out. I was then pondering the most unpleasant thought that he could be clear up in the frame of the car; no telling where this hole ended!

I took the back seat out but to no avail. By then I was getting very aggravated and decided I was going to be as stubborn as he was. I retrieved a bee smoker from the tool shed, crawled in the trunk, and began smoking the hole violently. The smoke wasn't drawing so I came out coughing and sputtering before the groundhog did. I don't know who was making the strongest comments, me at the groundhog or my wife at me when I began drilling a hole in the wheel well of our car so the smoke would draw.

When I began smoking the hole again everything was going beautifully, the smoke was circulating everywhere. Just about the time I expected him to come crawling out looking rather green, I heard a blood-curdling scream come from inside the house. Running inside, I saw my wife pointing at a bag of material scraps that I had unloaded from the trunk, crawling around the living room.

Need I say more? Except that on our next trip home the young fellow was released near my wife's home where he lives happily under the wood shed near the house. ◆

Dan Moore
Wildlife Protector

Motor Thefts Increase

Outboard motor thefts cost boatmen close to $1,500,000 last year, according to a survey by Evinrude Motors.

The problem of stolen engines has grown steadily with the increased number of outboards used by the public. More than 500 thefts were reported to Evinrude in 1969, and that's just one manufacturer. Multiplied industry-wide, motor thefts probably approached $1.5 million.

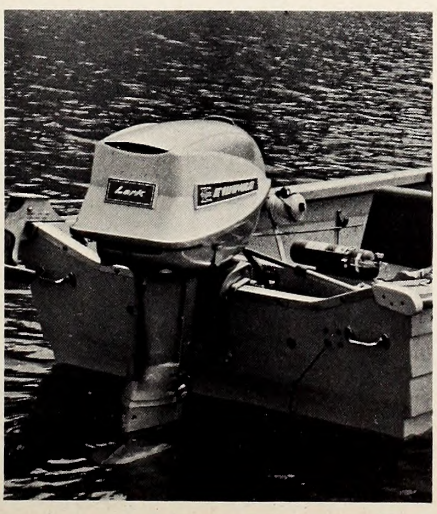
Portability is one big reason why thousands of boatmen prefer small horsepower outboards. Apparently this feature attracts the thief as well. Small motors are also easier for a thief to dispose of because they don't require controls and steering connections.

Two-thirds of the motors reported to Evinrude last year were under 25 hp. Almost half of the total 500 stolen were in the 6 to 9.5 hp range. About 1/10 of the motors stolen were over 50 hp.

If your motor is stolen, it is probably gone for good. The recovery rate is low, especially for smaller motors. Stolen motors of higher horsepower are somewhat easier to spot because they are often taken without their electrical connections.

Carelessness is one big reason for motor thefts. Outboard owners should take the same precautions with their rigs that they do with their automobiles.

Let's hope that your motor isn't next on the list.



To protect your boat and motor against theft, follow these suggestions.

1. Record all serial numbers on the boat and motor and register them with the manufacturer. Keep a copy of these numbers for yourself.
2. Use a lock to secure your motor to your boat. Special locks are manufactured for this purpose and are a big deterrent to thievery. They are made of durable metal and cannot be broken or sawed through. Chains and bicycle type locks can be used, but chains can be cut and bicycle type locks don't protect transom bracket bolts that could be tampered with.
3. When trailering your boat don't leave it unattended. At night, wrap the trailer safety chain around a tree or post and secure it with a lock. Never leave equipment lying loose in your unattended boat. Don't think you rig is safe parked in your garage. Thieves have been known to pull right into driveways, hook-up and drive off.
4. If your motor has electric starting, never leave the key in the ignition. Protect manual starting motors by removing a spark plug or connector.
5. Report all thefts immediately to local authorities, your marine dealer and the manufacturer.

Here are some suggestions to protect yourself against the "good deal" on a motor:

1. Be suspicious of anyone who is quick to sell a motor at less than its reasonable market value.
2. Purchase a used motor from an established dealer or from someone you know. When you buy, get the motor's registration card issued by the manufacturer. It is issued only once to the original buyer.
3. Be suspicious if the motor is missing any of its electrical connections. Many times thieves in their haste to get away, cut the wires and connections.

KNOW YOUR PROTECTOR

Carey Dennis Thompson

Carey Dennis Thompson was born August 1, 1946 in Durham, North Carolina and is the son of Mr. and Mrs. C. N. Thompson.

Mr. Thompson graduated from Aurelian Springs High School in 1964 and served 2 years with the U. S. Army in Germany.

In June 1969 he attended the Basic Recruit School for Wildlife Protectors at the Institute of Government in Chapel Hill. He was employed by the Commission on July 1, 1969 as a Wildlife Protector Trainee and stationed at New Bern. On October 1, 1969 he was appointed Wildlife Protector and transferred to Elizabethtown.

Protector Thompson has attended Basic Inservice, Investigative Techniques, Pursuit Driving and Defensive Tactics Schools. He is a member of the Southeastern Association of Game and Fish Commissioners Law Enforcement Section, Bladen County Law Enforcement Officers Association and National Rifle Association.

He is married to the former Vicky Fleming of Scotland Neck, North Carolina and they have one child, Angela, age 3.

DIVISION ENFORCEMENT RECORD FOR AUGUST 1971

HUNTING & FISHING

Persons checked	18,238
Total prosecutions	676
Total convictions	663
Total cases not guilty	2
Total cases nol prossed	8
Total cases dismissed	3
Total fines collected	$4,960.00
Total costs collected	$8,967.00

BOATING

Persons checked	9,209
Total prosecutions	482
Total convictions	463
Total cases not guilty	6
Total cases nol prossed	11
Total cases dismissed	2
Total fines collected	$ 904.00
Total costs colected	$6,603.54

All fines and any arrest or witness fees are paid into the school funds of the counties in which the violation occurred, and no part of the fines or costs collected are paid to the North Carolina Wildlife Resources Commission or its personnel.

Color Crescendo

The carrousel of color,
has reached a crescendo high,
As we view vivid Autumn,
from fields, trees and sky.
Green hills now are golden,
trees every hue,
Flaming, crimson creation,
soon now is due.

Landscapes are magnificent,
painted by The Artist's Hand,
Pumpkins, persimmons and nuts,
provided by The Master's Plan.

Frosty nights come stealing,
to etch each day's review,
Our hearts beat more wildly,
as we awaken to Autumn's Debut.

Soon the snow falls quickly,
quilting a blanket at night,
Painting a picturesque picture,
painted in exquisite white.

My window awakens me to wonders,
as I widen it to view,
I've never seen more beauty,
tell me truly—have you?

Louise L. Lentz

PHOTO BY JOEL ARRINGTON

More of everything will be evident in this year's State Fair area of the Wildlife Commission. A new circular cage has been installed, several additional aquariums and plenty of walking space. The area is free and open daily 9 a.m. to 9 p.m.

Don't Miss State Fair "Wildlife" Exhibit

Last year's award-winning Wildlife Commission State Fair Exhibit Area will be expanded 50 percent this year. The popular display which has proven to be one of the State Fair's top drawing cards, hopes to have several additional animals not shown last year. The list of North Carolina wild animals includes black bear, gray fox, whitetailed deer, wild turkey, and many more, plus two special attractions, an albino squirrel and an albino raccoon. These white oddities are seldom seen in the wild and should be a center of interest.

Four additional 300-gallon aquariums will be added this year, and fresh water fish to be featured include walleyes, striped bass, smallmouth bass, largemouth bass, bluegills, muskellunge, and those huge catfish that fascinated the crowds last year.

The wildlife exhibit area will be in the same location, on the northwest corner of the race track, near the lakes. Admission to the wildlife area is free and it will be open daily from 9 a.m. until 9 p.m. You won't want to miss this opportunity to see and learn more about your wildlife resources. See you there October 15 through October 23. ⬍⬍

Ricky Raccoon

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POKEWEED— Food for Wildlife

Story on page 23
Photos by Michael A. Godfrey

The abundant pokeweed may have gone unnaticed, but chances are that you have brushed by it dozens of times this fall. From spring (above) to late fall (lower left) it provides food for many wildlife citizens. Even the wolf spider finds its shelter comforting at times.

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Wildlife

IN NORTH CAROLINA

PHOTO BY JACK DERMID

THE SACRED BIRD

Stonding in water, ice on your toes,
You know that red bulb on your foce is your nose.
A look ot the sky, so dork and overcost,
Tells you the cold is most likely to last.
Fighting the wind, which cuts right through,
You feel your honds getting stiff, turning blue.
Whot now? A terrible thunder, o roor,
The worst of the worst—a wet, cold downpour.
But all of this you must toke in your stride,
As you walk on the ice with o slip and a slide.
You mutter ond mumble thot the weather is cruddy,
But you know that you're doing no worse thon your buddy.
You trudge through the morsh with o sludge ond o slop,
Till thot wild wonderful sound mokes you both stop.
Freeze. Don't move. Now's no time to be hosty.
Get o hold of yourself ond flip off the sofety.
A burst of sound—your quorry tokes to the oir.
Missing this one would bring certoin despoir.
The trigger goes bock with o deadly BOOM.
You know thot your torget hos met with its doom.
With your nerves bock to normol you run through the muck,
Glowing with pride os you pick up your
Duck.

Jimmie E. Williomson
Smithfield

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

* * *

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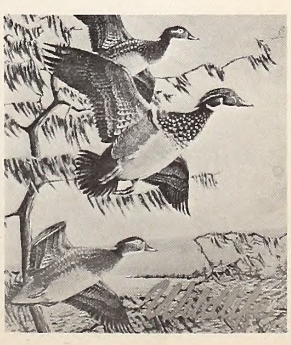


The male wood duck, even silhouetted against an early morning sky, must be rated as one of our most beautiful of waterfowl. His mate, although a bit on the drab side, still has much charm. This painting won Best of Show award at last year's Wildlife Art Exhibit held in Raleigh. Information on this year's event is found on page 27. For more of artist Mike Smith's fine work, plan now to attend the North Hills exhibit December 2, 3 and 4.

Coastal Environments

CONCLUSION

by Dr. Thomas Linton
and
Dr. Arthur Cooper

Photos from Division of Commercial and Sports Fisheries

Dr. Linton is Commissioner, Division of Commercial and Sports Fisheries; Dr. Cooper is Assistant Secretary for Resource Management, Department of Natural and Economic Resources. **This month they continue the discussion of the problems associated with digging and filling of estuaries along our coast.**

The top photo depicts a study in contrasts that often occurs along our coast: development in the background, a natural area in the foreground. Left, barrier dunes have been leveled for additional construction. Problems often arise when beaches are thus exposed.

• A new trend that shows significant promise is employment of the Public Trust Doctrine. This Doctrine is rooted deeply in English common law and Roman law. Professor Joseph L. Sax in an article considering this matter, states the approach taken in the United States as follows: "Our system has adopted a dual approach to public property which reflects both the Roman and the English notion that certain public uses ought to be specifically protected. Thus, for example, it has been understood that the seashore between high and low tide may not be routinely granted to private owners as was the general public domain under the Homestead Act and similar laws. It has rather been a general rule that land titles from the federal government run down only to the high water mark, with title seaward of that point remaining in the states, which upon their admission to the Union took such shore lands in 'trusteeship' for the public." This in essence says that the State has at no time had the right to transfer lands below the high tide mark to private ownership. But, in many states this has been done, generally by act of the legislature. The legality of such transfers is a matter that will have to be settled by the courts. However, even if it is determined that specific transfers of submerged lands below the high tide mark were permissible and that the States have acted within proper legal confines, then the public trust doctrine can still be of value.

In transferring land to private ownership, it can be argued that the title carries with it certain restrictions because these lands possess a greater value to the public. Therefore, this public interest must be maintained and protected. The restrictions would allow for a wide range of activities to be conducted upon the land, but others would be prohibited. Those to be prohibited would be, we suspect, permanent alterations such as dredging and/or filling since these would remove the land from its natural and historic use in the production of fish and wildlife resources, a resource that has been documented in numerous court cases to be the property of the public at large.

It appears, through recent federal court action, there is going to be more federal intervention in the estuarine areas of the United States.

Sand Dunes

Another characteristic feature of the natural estuarine ecosystem, adversely affected by man, is coastal sand dune systems. These, too, have the three major components (natural, human use, man-made controlling components).

Sand dunes are a prominent coastal feature. In an aerial view of the coast, it is easy to distinguish

fossil dunes located inshore from the surf, and in many cases covered with trees. Sand dunes located very near the surf zone are the recent and active ones and serve as a barrier and protective device for the coastal area. All experts in shoreline dynamics agree that a strong, well-vegetated dune system is a major source of protection against erosion and storm damage.

With the increase in population pressure in the coastal area and growing demands to provide second homes and beach cottages, it has become a common-place practice to level sand dunes. The fill material is used to bring to grade land for houses and trailer parks. The removal of these natural protective structures exposes the beach strand and the inshore lands to the full force of storm tides and hurricane winds. The resulting damage from this unwise practice has prompted many states to take action to prohibit further destruction and weakening of dune systems.

Ian McHarg, in his book "Design With Nature", devotes a chapter to development in coastal areas. He spells out in detail some of the natural laws that should not be violated in developing beaches. For example, he points out the fact that developments between the dune line and the ocean are very short lived. He further stresses that if dunes are removed, or if their protective vegetation is destroyed or removed, or if the water level is lowered so that the dune cannot receive adequate moisture to support protective vegetation, then the protection afforded by the dune will rapidly disappear.

In North Carolina, we have one law that specifically addresses itself to sand dune protection. The statute is a county-enabling act and it prohibits the destruction and alteration of sand dunes without obtaining a permit from the board of county commissioners. This law provides for the establishment of shore protection line, and a permit must be obtained before any alteration of the sand dunes seaward of this line is permitted. A shoreline protection officer, designated by the county commissioners, is given the responsibility of administering the law. He is required by statute to look at the proposed alteration to determine whether such work would materially weaken the dunes so as to destroy the protection afforded by them. If such activity would result in damage to the dunes system, then the permit must be denied. To date, only two counties have enacted this ordinance and it is too early to tell how effective it will be in protecting sand dunes in these counties. It is obvious that the law is not effective in the other six coastal counties that do not comply with this ordinance. It has been recommended that the 1971 General Assembly amend the statute giving the counties until January 1, 1972, to take the necessary action under this statute to protect their sand dunes. If they have not acted by then, the legislation proposes that the State Department of Water and Air Resources assume control of sand dune protection.

An additional loophole exists in this statute in that the authority for establishing sand dune protection applies only to counties and not to incorporated municipalities. Thus destruction, modification, or alteration of sand dune systems may occur therein and be beyond any authority of this statute and the county commissioners. It therefore seems most likely that it will be necessary for the State to assume the authority for the protection of sand dunes when local governments cannot prevent their continued destruction. There are a variety of pathways that we can follow to assure that the effects of alterations are minimized. One, for example, involves concentration on research programs that actually seek to restore damaged ecosystems. Notable success has been achieved in North Carolina in repairing both salt marsh and sand dune ecosystems. For example, programs of planting and fertilizing have been developed that permit stabilization of shifting and damaged sand dunes and even the construction of new dunes where existing ones have been completely removed.

The Most Promising Avenue

In attempting to manage the coastal area wisely, the most promising avenue whereby this can be achieved is through the development and enforcement of reasonable laws and regulations. It is not an unbearable restriction to require that a person who wishes to develop in the coastal area put his housing development on the natural highlands, and that residents who desire water access build walkways out across the marsh to the natural channel, thus requiring no filling. It is not an undue request to make of a land developer that he place all spoil materials removed upon the high land behind dikes to prevent their reentry into the waterways and that these materials not be allowed to cover, destroy, or remove marsh lands from their productive state. It is not an unreasonable request to make of a developer that he obtain his water supply from a regionalized water system and not directly out of the ground, thus causing a lowered water table and death of protective vegetation, or saltwater intrusion into the water source. It is not an unreasonable request to make of the developer that he properly treat the sewage effluent generated in his housing development and transfer it to a regionalized sewage treatment facility. It is not an unreasonable request to make of a developer that he leave the sand dunes intact to provide natural protection from the sea. All of these restrictions are in accord with ecological processes and are designed to protect and perpetuate the very environment the developer uses to attract people to his development!

In essence, we are saying that man's institutions must exert controls that require him, as Ian McHarg has beseeched, to "Design With Nature." In all instances of which we are aware, when man has attempted to design against nature, the result has been a thorough and resounding defeat for man. We must live with, and design with, nature if the estuarine ecosystem is to remain viable. ⬍⬍

Wild Turkey Considerations—

With Emphasis on Spring-Only Hunting

by R. W. Bailey
Wildlife Biologist

LET us consider the wild turkey, a strictly American bird, tough, hardy, adaptable. It exists in grass-bayberry moorland in Massachusetts; in the subtropical savannahs of Florida; on treeless plains in Texas where it roosts on telephone poles; in near-treeline habitat in the Rockies; in the red spruce forests of West Virginia, where it shares habitat with the snowshoe hare and the fisher—both typical Canadian Zone mammals; in Hawaii; in Wisconsin, where it survives severe winters by feeding on deer carcasses and on the cambium layer of birch trees felled a year previously; in Fulton County, New York, on the edge of the Adirondacks; and on Presque Isle, a suburban park in Erie, Pennsylvania. As remarkable as any of the above, is its occurrence in fair numbers in scattered portions of North Carolina's Piedmont where the range is heavily fragmented by roads, homes, towns and a general high level of human activity. This occurrence possibly reflects the ability of the species to survive in a fragmented—but otherwise superior—range.

Equally interesting in North Carolina is the steady decline or scarcity of the bird in apparently good range, principally in parts of Randolph, Richmond, Montgomery and Moore counties, and continuance of fair to good populations in other parts of those counties. The tendency has been to blame the scarcity—particularly on Uwharrie Game Lands—to high deer hunting pressure. However, deer hunting pressure on the Camp Lejeune Marine Corps Base and on the Daniel Boone, South Mountains and Standing Indian game lands is also considerable, and turkeys persist or increase on those areas. Other than range destruction through logging and coversion to pine in the central and southern Piedmont, the most acceptable cause of low populations may be the massive and continued releases of pen-raised turkeys by clubs and private individuals. *Restoration efforts cannot justifiably be undertaken in areas where such releases are being made.* The Commission does not presently have the power or the means to stop those releases.

The Caswell-Person county turkey population seems to be in incredibly good shape—incredible because of the high human density and the fragmented range. The Commission's intensive management and protection program on the Caswell Game Lands no doubt deserves much credit for the rosier outlook here. But let us not delude ourselves one bit. While this population will probably continue in a healthy state as long as current environmental conditions continue, those conditions can change very rapidly. Following a few changes in land use, the Caswell-Person turkey population could disappear in a very brief period! Range conditions and populations are never static.

To a considerable extent, North Carolina is a "mirror image" of Tennessee. In the last 15 years the turkey disappeared from 29 counties in Tennessee *despite* a restoration project and spring-only gobbler seasons. North Carolina "lost" the turkey in 15 counties between the years 1934 and 1954. Even in Alabama the species is declining in the southwest apparently due to logging and conversion to pine. In parts of Florida, Texas and Virginia the bird is in trouble. The turkey is *easy* to lose! For the last half century we have been in process of losing it in North Carolina. Our goal is to halt that trend.

The U.S. Marine Base, Camp Lejeune, is an area that illustrates what good management and protection can do for turkeys in North Carolina. The Lejeune range may not be outstanding, but turkeys thereon are subjected to relatively little illegal hunting and the bird's year-round needs are met through an intensive land management program. Consequently, the area's turkey population is perhaps the densest in the state. Naturally, we cannot recommend that platoons of Marines and MP's be maintained in every county in order to protect our turkeys. If we hunters aren't capable of setting decent standards of conduct and achieving personal adherence to those standards, we are unworthy of the opportunity to hunt turkeys.

From the turkey hunter's point of view, one of the more regrettable things now occurring in North Carolina is that the state's "third forest" is being harvested. The effects on turkeys will likely be pronounced, particularly in the Roanoke Valley where large tracts of bottomland hardwoods are being clearcut and, all too often, converted to pine. Clearcutting on a vast scale, conversion to pine, drainage of wet areas to make them suitable for pine, and human "progress" in the form of subdivisions, roads, factories, and dedication to unceasing growth of the Gross National Product will ultimately spell the doom of all turkeys in North Carolina, except perhaps in the larger pockets of public lands.

Statewide, one bright spot exists: the western mountains. They appear to have a high potential, but one is sobered by the amount of work to be done in restoring the turkey to those vast areas. Two western areas were stocked the past winter and two have been selected for stocking during the coming winter. Within the next three to five years,

* Based on a talk presented at the Annual Meeting of the North Carolina Turkey Hunters' Association, Durham, May, 1971.

we hope to be able to report progress in the West.

In tackling North Carolina's turkey problems, our toughest fight is with our ignorance. While we have general knowledge about where the bird occurs, we know next to nothing about what controls its distribution or various densities. Only on certain Game Lands do we know how many are legally killed. Harvest regulations and management decisions are based on sportsman and biologist field reports, and on information gleaned from other states and empirically applied to North Carolina. The big game tagging regulation on Game Lands serves certain enforcement purposes, and hopefully will provide some information about the take of turkeys on Game Lands, but at best it will fall far short of our need for statewide kill information, and hence will not significantly improve our knowledge of the harvest. THE GREATEST NEED IN NORTH CAROLINA IS A BETTER KNOWLEDGE OF THE HARVEST. A mandatory reporting law with a checking-tagging system is needed.

As previously stated, our goal is, or should be, to reverse the steady downward trend of turkeys that has for so long prevailed. An important step taken in this direction was the recent abolishment of the winter season. The following summarize justification for that step:

1). In a spring season, hunting will be truly selective for males, eliminating the hypocrisy of a winter season. Hunter-submitted wingtip and foot samples in the 1965-66 season (winter) revealed that females comprised 27 percent of the kill. These were surely submitted by persons who did not know they had taken females, suggesting that a larger, random sample might have revealed a *harvest of females equal to the proportion of females in the population!* Thus, abolishment of the winter season gives hens more protection.

2). A spring season permits selective hunting for males by all groups of hunters. A "male only" fall or winter season is ineffective in protecting hens because so many hunters are unable to distinguish between the sexes under field conditions.

3). Hens are normally incubating when spring hunts are held and therefore relatively invulnerable to hunting. Spring seasons give hens the protection needed and simultaneously allow recreational use of the resource.

4). A spring season probably enhances production of young turkeys through removal of excess males.

5). A spring season has no adverse effect on populations of following years. A low or new turkey population, if hunted only in spring, will expand as though not being hunted at all.

6). Enforcement of a spring "male only" season is easier and more practical than enforcement of a winter "male only" season.

7). Hunter success is higher in spring than in winter.

8). Turkeys bagged in spring are usually larger, more handsome trophies than those taken in fall or winter.

9). In spring, when the objective is to call up a gobbling bird, one can hunt more pleasurably and in greater relaxation because he will be less fearful of making mistakes that might result in embarrassment or fine.

10). One can hunt in spring with the knowledge that if he bags a turkey—one of the world's largest and most magnificent game birds—he has more likely *helped* the population rather than *harmed* it.

11). A spring season provides an opportunity to hunt at a pleasant time of the year and at a time when other game hunting is not allowed.

While many side issues were involved in the spring turkey season vs. winter turkey season debate, there is nearly universal agreement that a spring season is the *biologically safest* way to extract recreational hunting use from this resource without endangering it. Therefore, in view of the general decline of the turkey in North Carolina the obviously best course was to skip the side issues and concentrate on halting the downward trend by adopting a spring season only. If this procedure works (the possibility exists that it may not), turkey populations will expand and occupy new territory, at least in some sections. Populations on some publicly-owned areas may increase to a level that will allow our restoration program (live-trapping and transplanting) to proceed much more rapidly.

The ban on winter hunting is by no means to be regarded as permanent. We do not intend to forget the "ancient adages" of game management: That the greatest sin is to overshoot and that the second greatest is to fail to harvest the available crop. We look forward to the time when winter hunting, even "either sex" winter hunting, can be our pleasure. That time will come when the bulk of the now unoccupied range is stocked, when population surpluses are obvious, and when a mandatory reporting system is in effect, enabling those charged with regulatory and managerial responsibilities to evaluate the effectiveness of their programs.

The following represent a few things that individuals and clubs can do to hasten the recovery of the turkey in North Carolina:

- Work for legislation that will require a suc-

• **continued on page 26**

MANAGING FORT BRAGG'S FORESTS

by Specialist Four Jim Natherson

Information Office XVIII Airborne Corps and Ft. Bragg U. S. Army Photos

One of the dangers of troop training in the woodlands comes from weapons firing and possible resulting wildfires. This article discusses such problems.

FOREST management is not unique to Ft. Bragg by any means. Forests all over the country are managed and controlled by man for various reasons. Providing recreational playgrounds and scenic parks, havens for Sunday drivers and tourists, hunting grounds and fishing paradises, fire protection for nature, timber to harvest for profits . . . all are common jobs of any forest manager.

But the foresters here must go one step further, for they have an added primary "mission." They must not only manage the reservation's forests along conventional lines, but also assure an optimum troop environment for the some 37,000 soldiers stationed here.

Such a tailor-made, yet basically natural forest is indeed alive, well and prospering. But this is not happenstance. In fact, when you're talking about successfully managing 213 square miles of land, with 114,000 of its 136,000 acres engulfed in trees and vegetation, you're talking about a gigantic operation.

This takes a staff of 15 full-time civilian employees and two military personnel headed by post forester William Paschal and his assistant, Henry H. Davis. In addition, through the Army's Project Transition Program, a number of soldiers who are nearing completion of their military service are able to receive on-the-job training in forest management by working with the Bragg foresters.

Training troops in the woodlands of Ft. Bragg creates a number of problems, as well as compounding natural ones. One of these is the forest fire.

Smokey Bear, Revisited

The thick underbrush is extremely flammable, leaving an ever-present danger of rapidly spreading wildfires. Danger lurks every time a hot weapon is fired, a campfire in a bivouac area is made or left unattended, or a cigarette is carelessly tossed away. If it weren't for the efficiency of the foresters' fire control operations, wildlife damages could easily get out of hand and spread to training settings that it might have taken years to create. Although the frequency of fires on the reservation is high, the resulting damage is kept to a minimum.

The first step to fire control is detection, which must come quickly in such a thickly-forested area. On the post there are three fire lookout towers, strategically located at high elevations and manned constantly during hazardous fire periods.

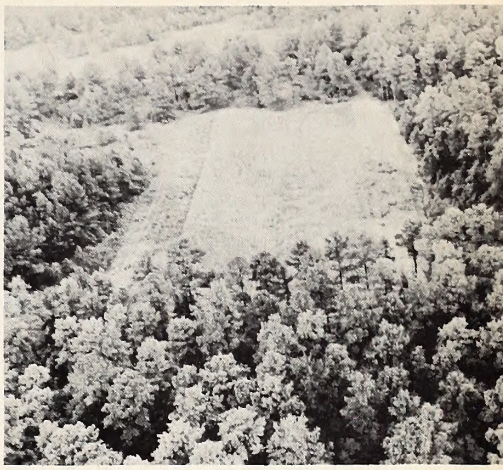
The Bragg foresters also work hand-in-hand with spotters in state towers that surround the reservation. Between the post and state towers, fires can be detected in their early stages.

Once a fire is spotted, a vast network of firebreak access roads (man-made and totaling 900 miles) is used to reach the burning area. Using fire-fighting equipment, the foresters can contain the fires via the access roads, thereby keeping the fires from reaching uncontrollable size or spreading to larger areas.

Fighting Fire with Fire

To prevent fires, the foresters regularly burn away highly flammable groundcover wherever it won't interfere with troop training areas.

The "prescribed" burning at Ft. Bragg is conducted on a five-year cycle—one-fifth of the protected woodlands are burned each year, thereby covering the entire reservation in five years. Through prescribed burning, unwanted vegetation can be burned safely with controlled fires without harming resourceful stands. It can be used to make way for new training areas and refurbish old ones.



"Prescribed burning" is one of the Ft. Bragg foresters' most useful tools, clearing the way for growing young trees and better wildlife habitat. Above, a game food patch, set in the middle of surrounding trees offers game added food.

The careful selection of a suitable day is made only after the foresters consider a number of crucial factors, including wind velocity and direction, humidity and temperature. January and February generally offer the best conditions.

The principal technique of prescribed burning used by the Bragg foresters is the "backing fire." The burning fire is set along a prepared breakway access road to back into the wind, burning against the wind at a rate of 100 feet an hour, which eliminates the possibility of sudden spreading or damage to woody vegetation.

Prescribed burning not only helps the foresters to prevent many of the fires, but also to prepare seedbeds for planting, to thin plantations and thus reduce competition between stands, and to control diseases.

Repeated studies on the reservation have shown that game food and cover production is increased tremendously when a combination of prescribed burning and clear-cutting of the land is used. In fact, it is not uncommon to have seed production for such wildlife as quail, turkey and dove increased by 300 percent and plant abundance by 100 percent per acre by employing the clear-cutting/prescribed burning plan.

Prescribed burning also helps keep a desirable balance of browse and mast-producing oaks available for deer. Browse plants, especially, are characteristically heavy sprouters following a fire. Their quality as well as their quantity profits through prescribed burning.

Because the clear-cut areas are replanted with pine seedlings and will eventually close in again and cause the game food to be reduced, the designated areas are kept to a maximum of 100 acres and scattered throughout the reservation.

When the forest floor is choked with wire grass and forest litter, wildlife population decreases because of the lack of food. Again, prescribed burning is used to eliminate this condition.

Ft. Bragg's forestry section and its fish and wildlife section have worked out procedures by which the prescribed burning program can best benefit both forest management plans and habitat improvement.

What's more, the prescribed burning program on the reservation is currently being revised to enhance both forest and wildlife management even more.

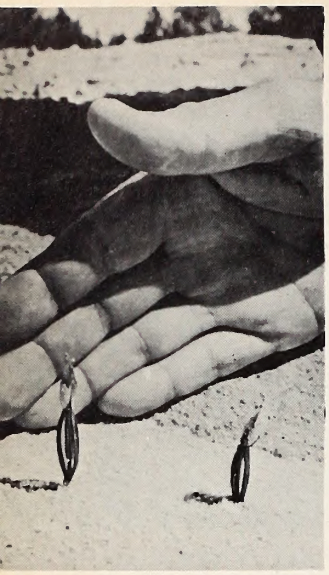
The new plan will use strip burning rather than area burning. The reservation will be divided into strips two-tenths of a mile wide, separated by narrow access roads. Adjacent strips will not be burned during the same year so that sufficient vegetation for wildlife will remain. This will also create more retreats for wildlife when fires break out.

The Perpetual Forest

Reforestation is still another important job that the forest managers must tackle. Natural reforestation takes place wherever hearty seed trees grow. But natural reforestation is not enough to keep the forest perpetual and healthy.

Through reforestation, the Bragg foresters are able to keep the troop training environment changing constantly as well as provide variety throughout the reservation.

Artificial reforestation on the reservation consists of a series of steps to clear and prepare the land and plant seedlings. Reforestation is done one area at a time, ideally a maximum of 100 acres. Keeping the areas to 100 acres benefits wildlife by providing more "edge," and furnishing a system of a number of alternating areas suitable for feeding, nesting and cover.



It's a long journey from tiny seedling to towering pine. Ft. Bragg foresters provide help and protection where possible. When natural reforestation is impossible, the foresters supplement the perpetual forest with machine planting.

The Harvest

It may be said that harvesting, more than anything else, separates a managed forest from a wild one. When an area becomes too densely stocked, the forest becomes closed in. Competition between trees reaches extreme proportions, and water and minerals get more and more scarce. Sunlight does not reach the forest floor to nurture game food plants.

From the silvicultural point of view, the forest will actually become stagnant with too many trees and vegetation sharing the land's potential.

At maturity, physiological changes in trees limit their annual growth increment to a fraction of that characteristic of the younger, healthier trees. When too many trees have reached their maturity, the land is wasted and the trees, being weaker, are more susceptible to disease and insect attacks which could spread to the younger plants.

This is where the Bragg foresters come to the aid of nature. Not only will their harvest provide revenues but, through harvesting, they will also be able to make the forest healthier.

A stagnant forest is not compatible with an optimum troop training environment. Taller stands must be removed to make way for smaller ones so that at all times the forest floor and elevation may vary. Planned harvesting can help the foresters create tailor-made settings for training.

Mature trees, as well as damaged, diseased, undesirable and poor quality trees are harvested. The Bragg woodlands have been charted into 10 unequally-sized compartments to facilitate a 10-year cutting cycle. One compartment is harvested each year so that the entire reservation is harvested every 10 years.

The larger, sawtimber-sized stands are cut, and the land is soon reoccupied and regenerated with fast-growing plants. Frequent cutting and thinning of a stand of trees greatly improves the quality and productivity of the forest. Thinning to an ideal stand density increases the distance between each tree and creates openings in the forest canopy. Not only do the trees react by maximizing their individual growth, but small plants quickly fill the openings and provide more game forage. At the same time, proper thinning also provides more and better maneuvering areas for troops and vehicles.

Eventually, the situation will recur. The canopies of the larger trees will again close in over the forest. If it weren't for repeated thinning, reduced growth rates and lower food production for game would follow.

So the 10-year harvesting cycle employed by the Bragg foresters in effect rescues the forest from its own natural problems.

The Enemy

Man, often called the uncontrollable factor, may be the forests' worst enemy. On Ft. Bragg, an informational program for soldiers helps the foresters with their job of managing and protecting the forests. But man is not the only living enemy of forests.

Insects keep the foresters busy, too. There are three types of beetles which cause the most concern: The Southern Pine Bark Beetle, the Ips Beetle and the Black Turpentine Beetle. Outbreaks from these beetles are common when trees are weakened by wildfires, lightning strikes, drought and damage from vehicles, thus making the trees susceptible to invasion by beetles.

Protective measures are effectively carried out following wildfires by randomly spraying enough trees in the hot spots of burned areas to keep epidemics from starting. Once outbreaks are detected in small areas, the result of constant surveillance, they can be controlled by spraying. Large areas of beetle infestation can be controlled more economically by harvesting the infected trees.

Three forest diseases also create their share of concern throughout the Ft. Bragg woodlands: Brown Spot Needle Blight, which is controlled by prescribed burning; fusiform rust, controlled by harvesting the infected, although usable trees; and fomes annosus, which has not yet been detected on the reservation, but would be controlled through harvesting and stump treatment.

Without control, both insects and disease could quickly destroy years of planning by wiping out entire troop training areas.

Ask any sportsman who has taken advantage of Ft. Bragg's 114,000 acres of controlled woodlands, or any soldier who has simply taken his family to the outer limits of the reservation for a scenic Sunday drive. Despite the rifle ranges and parachute drop zones that break the horizon here and there, it is truly an inviting hideaway from the commonplace.

There is indeed a distinct difference between a controlled forest and a wild one. That difference comes only through attentive forest management.

At Ft. Bragg the difference is made by Bill Paschal and his team of experienced foresters. ◆

The Second Time Around

by Mike Gaddis

© Mike Gaddis, 1971

"YOU know when I was growin' up I had all the opportunity in the world to bird hunt. My dad owned dogs, hunted all the time, and was always tryin' to get me to go. But I always wanted to be off fishin', or squirrel huntin', or doin' somethin' else.

This was Bill Williams and the conversation hinged around the end of a day's quail hunting, focusing from time to time on different aspects of this general field of endeavor. Bill had carved himself out a new theme and went on to sum up his argument.

"It seems to me that you don't see many boys huntin' birds. I mean, you may find a lot who undergo passing infatuation with it but I'm talkin' about the day-in, day-out, dog-followin', briar bustin', fall in a stumphole, bird missin' kind of bird huntin'! The kind that makes you wonder why you go sometimes when you think about it in passin' and the kind that makes you live just to go again when you think about it a little longer. I guess you have to do some growin' up before you can really enjoy bird huntin'."

I was pretty quiet through all this. Bill had struck a concordant note with me and I sat pondering a case in point in my next-door neighbor's son, Bobby Douglas. Bobby has recently turned 14 and embodies a good many of the budding characteristics which give promise to his success as both hunter and fisherman. He hasn't had a lot of experience afield or astream yet but it's to his credit in this day and time that he's forever eager to be located in one area or the other and to learn as much as possible about both. But he's been squirrel hunting, and dove hunting, and duck hunting. And I've at least exposed him to bird hunting.

I hoped for a good hunt that day and as it went the dogs worked well and the birds were reasonably plentiful. I was a little disappointed at Bobby's verbal reactions to the proceedings as we stood and watched a rightful finish to the day with the sun putting pink, red, and then purple tinges on washboard formations of clouds, but then maybe I was expecting too much. After all we had walked all day, and I remembered that I hadn't cautioned him to wear leather-fronted pants, and I recollected that he hadn't had much luck with his shooting.

At any rate I got to thinking about it right heavy and the other day I put the question to him. "Which do you like the best, dove huntin' or quail huntin'?"

It didn't take long for him to reply. "Dove huntin'!"

"Why?"

"Well, I don't know. With bird huntin' I like to watch the dogs but the briars are so bad, and the birds always get up when I'm not expecting them and they're gone before I can shoot, and I'm always afraid I'll shoot you or the dogs, and there's so much walkin', and—"

"Hold on," I countered, "or is there more to the indictment? What's so great about dove huntin'?"

"Well, with dove huntin' you can see the birds comin' a long ways off and get ready, and there's plenty of action, and I always know where you're at."

In all fairness to Bobby he's only had basic exposure to quail hunting and he's willing to give it another go, but his feelings are, I suspect, not uncommon among boys his age. Bird hunting does demand a lot. In fact, it demands maturity a lot of men never attain.

For instance you can do pretty well on doves

and squirrels without a dog, although a consistent retriever and a decent fice never hurt either respective area. But to be successful with quail you've got to have dog or dogs, and preferably good ones. And I'm not talkin' about just to look at! While the sight of an intense pointer or setter holding a bevy in broomsedge never shortened any man's years, I'll drop the romanticism for a minute and say it's a downright prerequisite to bringing Bob to bag in useful numbers. You can hunt without dogs, but like eating peas with a knife, the givin' is more than the gittin'.

This means responsibility for proper care and feeding of a dog or two and perhaps even the training of your own in which case you train yourself in the process. It means an everyday liability and not just an occasional requirement. Hopefully you come to look upon this as enjoyment, not drudgery but it's an accountability not to be taken lightly in all fairness to the animals concerned. An old time bird hunter I know puts it another way, "a man ought to have to take care of his own dogs to earn the privilege of shootin' over one." I'm inclined to agree.

It means more though than just caring for them. It means learning what to expect from a pair of dogs day-in and day-out, accepting them for what they are and not wishing for what they aren't. It also means the critical importance of knowing when to correct a dog and when not too. A lot of dogs are disciplined unduly when an owner uses a switch before he uses his head. On the other hand dogs are allowed to compound faults because they are never corrected for them. To be a tolerable handler a man ought to at least be as smart as his dogs.

Another stringent requirement of bird hunting is proper gun safety. Perhaps no other form of hunting offers so many chances of getting shot! Have you ever stopped to think that almost every shot in quail shooting is chest or head level or a little above and that a preponderance are crossing shots which require a horizontal swing of the gun muzzle while trying to keep in mind that a partner is ten feet away? Or how tempting that single bird is that careens away from underfoot when you've temporarily lost your companion in close cover? It's a bit more sobering perchance when you think that your partner may be facing the same temptation 25 yards away.

And if that's not enough to cause contemplation have you ever been hunting with someone who persisted in carrying his gun in the crook of his arm so that its muzzle was staring you dead center everytime you forgot yourself and walked abreast or when he turned to talk to you. I have and the feeling is everything but comfortable. My trips with such types generally average one.

Bird hunting demands a seasoned gunner who has absolute familiarity with his weapon and respect for what it can do. Keeping its muzzle away from companions on a hunt should come just as naturally as the finely tuned reflexes, seemingly involuntary, which bring it to shoulder and cheek on a covey rise. Experience gained in years long past a "wire edge" enable resistance to shots at birds with flight patterns that do not allow a safe line of fire. And even with this kind of familiarity with a gun a constant guard is required because the unexpected can always happen and does!

On one trip some years back I was hunting with an old friend who is both a fine shot and a careful gun handler. Having shortly before dropped an unannounced single which took the second barrel my friend was in the process of reloading as we walked a winding log road. I had stopped to listen for one of the dogs and walked up from behind. Not hearing me coming my companion had the muzzles of the broken gun pointed rearward and to the ground. Upon reaching him, having until then been intent on the dogs, I glanced up to notice that I was in direct line with the gun muzzles. I quickly sidestepped and walked up beside him. As I reached his side he closed the gun and it discharged, completely unnerving us both. His trained hand had been nowhere near the triggers and apparently the firing pins had not rebounded and caught the shell primer as breech met barrels. A moment earlier and I might not be able to follow a dog now—a hard-earned experience and an unforgettable admonition. You just never know!

An additional requisite for hunting over bird dogs with a partner is the matter of ethics. The code dictates such things as the man on the right taking birds going to the right on a bevy rise, the man on the left following through in like manner in the opposite direction, and never the twain shall meet. Proper comportment also demands that there be no argument over birds killed when both men happen to fire simultaneously at one up the middle and the pointed singles are to be taken turn and turn about. Never criticize the other man's dog and don't brag on yours. I find myself entirely too prejudiced to laud my own dogs. Performance tells the story in the end anyway and words are generally unnecessary except to savor particularly fine work.

When you put all the foregoing together you come up with a composite actually greater than the sum of its parts. Robert Ruark wrote a piece on fishing one time and titled it "Fishing Is a State of Mind." Ruark always was good at titles. You can take that one off the water and apply it equally well to bird hunting! To be successful at it, to endure its frequent setbacks, and to wish every day was a hunting day a man has to develop a certain personal philosophy to fall back on. You can't approach bird hunting strictly in absolutes, it's at its best when you mix it with the proper abstracts.

For example you need a strong constitution to see you through when you suffer a shooting slump like I did mid-way through last season. Oddly enough my average didn't fall off much on woods shots but walking up behind a pointing dog to a

covey rise in the open I might as well have been throwing rocks. Time and again I stepped into fogging birds from rich bevies and emerged with only two empty shells. The dogs were getting hard to face! It really got embarrassing when Bill Williams joined me one day. Bill's a good enough shot to make almost anyone feel inferior even when he's at his best but that day was especially bad.

I called point for my setter Bess in woodsline stubble and Bill joined me for the rise. Bill crisply dropped the only bird to go toward the woods and I had the choice of targets on at least 15 birds that made a beeline for the woods on the opposite side of the open field! I stood with mouth agape as I realized I had shot twice and evidenly not touched a feather.

Along then Bill hollered, "How many did you get?"

Answering "None" in a case like that is one of the hardest things you ever have to do—talk about persecution complexes!

But slumps go about as mysteriously as they come. About the time you feel like you ought to bequeath your gun and loan your dogs to a friend who can offer 'em some retrieving practice you're finally granted blessed reprieve.

Another occasional thing that's hard to undertand in bird hunting and sends a hunter groping for the promise of better days is the seemingly complete absence of birds in places they ought to be. On some days even when the dogs are working beautiful over familiar territory where the home range of every resident covey has been surveyed through previous sojourns the birds just aren't to be found. Go back the next day and the dogs may find everybody at home. It's hard to explain.

And then there're briars, impenetrable heads, stumpholes, and reed thickets. Funny thing how a seasoned hunter never notices these things when the dogs point except when going becomes physically impossible. But one of the best possible ways to tell whether a man bird hunts ardently or not is to observe whether he has fresh scratches covering the back of his hands between mid-November and the end of February.

The same convictions that see you through the hard times also enhance the good, engendering the ability to derive maximum enjoyment from any given situation and lending veritable meaning to such abstracts as sport, sportsmanship, beauty, and gratitude. Flowery terms for contemporary use? I think not.

Don Huffman and I hunted a farm in the eastern part of the state last season on a day that started out gray with the somber tones that predict impending weather. If there's no wind a day like that is generally pretty good, the birds heavily feeding on instinct's warning of adverse conditions ahead. We hunted setter Bess and pointer Mutt and enjoyed a profitable forenoon with two covey finds and points on several singles. Early afternoon continued well on Bess' point in the woods near a heavy expanse of honeysuckle shortly after the noon hour; a short while later she was struck immobile again by a feeding bevy in woodsline lespedeza with Mutt coming in to do the honorable thing.

Around mid-afternoon we became suddenly aware of an utter stillness, the particular kind that means only one thing in Nature. Maybe you've noticed it. It began with a few errant flakes and a first slight rustle of sound as frozen particles hit tinder leaves. Thirty minutes later the woods on the opposite side of the large fields we were hunting were blurred white and here and there frozen accumulations were becoming noticeable on the ground. Snowfall is a lot of things to a lot of people. To me, in the woods, it is a most wonderful thing, especially if it also happens to be the first of the year and you're behind two bird dogs.

We'd had a good day and with the birds facing rough weather we decided to call it a day. We were walking across a field in the direction of the car in an old corn row which provided convenient pathway between dense, knee-high weeds harboring sparse patches of lespedeza. In the midst of an exuberant conversation about the snow and the day I glanced up to see Mutt, working ahead of us, suddenly wheel, wind, road a few feet, and firmly commit himself. His rigid posture left little room for doubt. The little setter bitch came in then and backed with the proud, lofty carriage I love her for.

We let 'em stand a long time.

"Mighty pretty," Don said. He said it for both of us.

On the rise we collected four birds, two neat doubles. The last bird made it to the woods but Bess made short work of the retrieve.

I've seen a number of bird hunting tableaus and hope to see a lot more. They were all pretty. But as a friend has a habit of sayin', "some just remember better than others." That memory of my setter and pointer, lofty and statuesque, holding a bevy amid heavy snowfall, the first of the year, is forever indelible. Maybe you have similar memories. If not, I wish you some.

If that trip had been one of my earliest at quail hunting I don't believe I could have perceived that scene with the satisfaction that I did. I'm hunting over my own dogs now in deference to then, I have some experiences to fall back on for comparison, and I've got a comfortable personal philosophy about bird hunting. I'm fortunate enough to have a few good hunting companions who share the faith, who think there's more to hunting than killing something. It didn't come overnight.

Like long pants and a sheath knife you have to sorta grow into bird huntin', the process, being more mental than physical, just takes a little longer. It's a happy journey, better with each milestone, and, as one of today's popular songs suggests, it's more comfortable the second time around. If you've been there you know what I mean. ⬍

Respectively dedicated to the memory of Nash Buckingham, whose death March 10 leaves a place in wildlife conservation and journalism unfilled.

As the unspeakable magnificence of a winter sunset painted the sky above the lonely lake, a sight unfolded before us that few now alive have been privileged to see. The western sky was literally darkened by the mass of ducks that took wing for evening filght. Thousands of waterfowl rose from the water as though they had but one mind and one guiding spirit. We were standing on the shores of Pungo Lake, at that time a pristine jewel near the community of Winona. Within 48 hours, the area we hunted was to become the Pungo National Wildlife Refuge. Probably no one hunted it after we witnessed this scene. It was a rare privilege to have been there.

And one wonders—what was it like here before the white man arrived? How much darker were the skies at evening flight 300 years ago? We read of endless streams of airborne waterfowl in the spring and autumn migrations. We read that the air was black with Passenger Pigeons and the Plains black with buffalo. What was it like and what happened? Much of the story has been retold many times, to the continuing sorrow of us all. We know of the rapid westward expansion of a young, vigorous and often thoughtless nation. Its population was growing by leaps and bounds and a hungry people must be fed. Game was there for the taking. And as the Industrial Revolution created new wealth, new appetites appeared. The diner wanted nothing but the finest canvasbacks on his table, accompanying the terrapin stew, oysters and red wines, so market hunting came into its own.

Waterfowl and shore birds have never recovered. And the sportsman now made his appearance, adding his shot strings to the kill. Something called nitro replaced the black powder being used, and shotgun shells were invented. The literature of waterfowling is filled with references to unconscionable bags. Thirty-nine geese in a day on Cape Cod, 640 ducks to market in a day from Great South Bay, 282 Ruddy ducks in a day at Currituck, and 2,300 Ruddys sent to market from the same locale in November, 1905. And so it goes *ad nauseam.*

Then came pollution, pothole drainage, drought, marsh fills, oil spills, mercury, and insecticides. The list is endless. Man has conquered, or destroyed, nature. But there is another side of the coin, one of far greater importance to us today. Man was able to look at himself and see that he was wrong. And through the miraculous if often frustrating processes of Constitutional law, ducks still fly. The story is worth telling.

The outdoor magazines of the 1880's and 1890's showed early signs of the awakening of America. Even prior to this, a few desultory efforts had been made to slow the destruction of our heritage, but with little effect. However, as the market hunter continued his ways, and the expansion of the country progressed, the rapid decrease in wildlife, and especially waterfowl, became obvious. It has been estimated that before the white man appeared, there were somewhere around 500,000,000 waterfowl at the peaks of their cycles utilizing the age-old flyways. By 1900, these had been reduced to somewhere around 150,000,000. The downward spiral continued virtually unabated until by 1930, only a pitiful 30,000,000 or so birds took to the air twice yearly in the timeless pattern.

But as it will happen in a society of free men, things had begun to change. The first great move was the passage by Congress of the Lacey Act in 1900. This piece of legislation finally brought under law the market gunning that was so destructive. It also put controls on the importation of exotic birds, and gave the Secretary of Agriculture authority to control and restore some vanishing species. Although enforcement of the Act was scanty, it was incorporated into the Penal Code in 1909 and expanded in scope in 1935.

The next step was a highly controversial one, the Weeks-McLean Act of 1913. Here for the first time the Federal Government was given authority to control and regulate the taking of migratory birds. It was no

A Saga of Ducks

by R. Wharton Gaul, M.D.
Charlotte
Illustration by G. Michael Smith ©

longer to be a purely local affair. Unfortunately, Weeks-McLean passed as part of a Revenue Bill. This plus its unpopularity with most gunners made it a battleground for several years, with a Supreme Court ruling as the goal of its opponents. Recognizing its weaknesses, conservationists shifted their fight elsewhere. In 1916, the United States signed a treaty with Great Britain controlling the taking of migratory birds. It also prohibited spring hunting, allowed closed seasons on certain species, and put a stop to egg collecting on the breeding grounds. In support of this treaty, Congress in 1918 passed the Migratory Bird Treaty Act. This put teeth into the law. The Federal Government now set seasons and limits and generally controlled migratory bird hunting. Opponents continued to fight back until 1920. In that year the Supreme Court, in the famous Holland v. Missouri, ruled in favor of the Federal Government. This ruling contains the familiar statement that States which argue that they should control the taking of birds which yesterday were far to the north and tomorrow are far to the south are leaning upon a slender reed, legal-wise.

Now the way seemed clear for restoration of wildlife. But it was not to be. At least not yet. Congress passed the Migratory Bird Conservation Act in 1929, with the object of purchasing suitable areas for Refuges. But on Black Thursday, October 24, 1929, the world fell apart. In the ensuing depression, Congress had no money for ducks. It was not until Franklin Roosevelt took office in 1933 that help was forthcoming. It is said that the right man at the right time can work miracles. President Roosevelt selected that man as head of the Bureau of Biological Survey. His name was Jay N. "Ding" Darling. A political cartoonist and conservationist, Ding Darling was able to provide the spark that rescued ducks from final disaster. He squeezed $17,000,000 out of Congress for conservation and restoration projects, and almost single-handedly reversed the trend of declining waterfowl.

Under his encouragement, along with others, Congress passed the Migratory Bird Hunting Stamp Act in 1934, bringing into being the now famous duck stamp. Ding Darling himself designed the first one. The following year, baiting birds and the use of live decoys was outlawed. In 1936, a treaty was signed with Mexico similar to the one with Great Britain. And in 1937, an Act of immense importance was signed. This was the Pittman-Robertson Act which levied a tax on sporting arms and ammunition. This money is then returned to the states on a percentage basis for wildlife restoration projects. North Carolina banks heavily on these funds for many of its wildlife projects.

There have been many other bills passed since that time. But two other aspects of the picture should be noted. One is the Wildlife Refuge system. This had its humble beginnings in 1903 when Teddy Roosevelt created the Pelican Island Refuge in an effort to save the nesting grounds of this bird. And until the advent of DDT and similar poisons, it appeared that the pelican was safe. Now extinction once more threatens. In 1908, the Klamath and Malheur Refuges were created by Presidential decree. As the Federal Government began to take over the management of many forms of wildlife, the system continued to spread and expand until by the end of 1970, there were 330 Refuges encompassing some 29 and a quarter million acres. This does not include the National Parks.

In the year 1929, one of those unique events took place which have punctuated the history of our nation. A group of sportsmen banded together to try to discover what was wrong with duck populations and what could be done to correct it. They called themselves "More Game Birds of America." After a few years study, including what is perhaps the first aerial survey of waterfowl ever carried out, they published information showing that 80 percent of our ducks are born in Canada and about 65 percent of them are born in Saskatchewan, Alberta and Manitoba.

It was clear that restoration projects in these areas were necessary if the effects of droughts and drainage programs were to be overcome. Accordingly, in January of 1937, they formed *Ducks Unlimited* to collect private funds for these projects. (The use of federal funds for such work outside of the United States proper is not legal.) In 1938, Ducks Unlimited-Canada was formed, to receive and disburse the funds. Since that time, millions of dollars contributed by American sportsmen have been used for projects designed to provide water for nesting waterfowl. Last year Ducks Unlimited members gave $2,000,000 for such work. Without this effort, it is doubtful if duck hunting would exist today, at least in the continental United States.

Many millions of ducks have taken to the air for their flights to the wintering grounds. They may well have been bred in a Ducks Unlimited project. They may winter in a marsh preserved by Pittman-Robertson funds. Before you go duck hunting, send a contribution to Ducks Unlimited. Then buy an extra duck stamp or two. And then tip your hat to the likes of Lacey, Weeks, McLean, Ding Darling, and thousands of others you may never have heard of. They wanted you and your son to have this opportunity. You're pretty lucky, you know. ▲▼

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

N. C. Fox Hunters Host National Meet

The N. C. Fox Hunters Association will be hosts to the National Fox Hunters Association for its annual field trials November 7-14. The trials will center around a new 150-foot by 52-foot pole barn on a six-acre tract near Laurinburg. The barn will shelter portable kennels for 600 dogs. This is the first time the National trials will have been held in North Carolina.

Waterfowl, Woodcock, Snipe Seasons Open This Month

The seasons on ducks, geese, and other waterfowl, plus woodcock and Wilson's snipe open this month. See page 17, this issue for a synopsis of dates, bag limits, and shooting hours. Complete migratory bird hunting regulations are not available from the post office this year with the purchase of duck stamps.

Hickory's Tommy Reese Gets Top Award

On October 26 Outdoorsman Tommy Reese of Hickory was given the highest honor awarded by Trout Unlimited, a national organization of conservation-minded trout fishermen. The award designates him as "Conservationist of the Year." A devoted trout fisherman, sportsman, and conservationist, Reese has championed the cause of better trout fishing in North Carolina for a number of years, and is a past president of the N. C. Wildlife Federation.

Hunters: Be Careful!

Thus far the North Carolina hunting accident rate has remained on a par with last year's excellent record, and the Wildlife Resources Commission urges hunters to maintain the good record. Funds provided by a federal tax on handguns will be used for setting up a concerted hunter safety training program to be carried on by the Commission's Division of Wildlife Protection.

North Carolina has usually had an excellent hunting safety record, and the new program will serve to better it.

NORTH CAROLINA MIGRATORY GAME REGULATIONS 1971-72

SPECIES	OPEN SEASONS DATES INCLUSIVE	SHOOTING HOURS	DAILY BAG	POSSESSION
Dove	Sept. 4 - Oct. 9 Dec. 13 - Jan. 15	12:00 Noon to Sunset	12	24
King & Clapper Rails	Sept. 1 - Nov. 9	One-half hour before Sunrise to Sunset	15	30
Sora & Virginia Rails	Sept. 1 - Nov. 9	One-half hour before Sunrise to Sunset	25	25
Woodcock	Dec. 11 - Feb. 12	One-half hour before Sunrise to Sunset	5	10
Wilson's Snipe	Nov. 20 - Jan. 22	One-half hour before Sunrise to Sunset	8	16
Geese(1)	Nov. 20 - Jan. 8	One-half hour before Sunrise to Sunset	1	2
Brant	Nov. 20 - Jan. 18	One-half hour before Sunrise to Sunset	6	12
Ducks(6)	Nov. 20 - Jan. 18	One-half hour before Sunrise to Sunset	3(2)(6)(7)	6(3)(6)(7)
Coot	Nov. 20 - Jan. 18	One-half hour before Sunrise to Sunset	15	30
Gallinule	Sept. 1 - Nov. 9	One-half hour before Sunrise to Sunset	15	30
Hooded, American or Red Breasted Merganser	Nov. 20 - Jan. 18	One-half hour before Sunrise to Sunset	5(4)	10(5)
Scoter, Eiders and Old Squaws	Nov. 20 - Jan. 18	One-half hour before Sunrise to Sunset	7	14

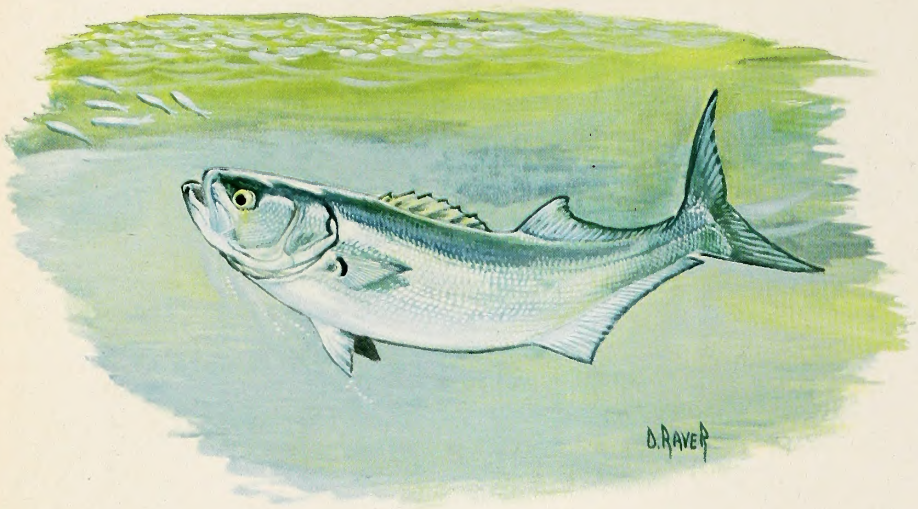
(1) Closed season on snow and blue geese.
(2) May not include more than: (a) 2 wood ducks; (b) 1 canvasback or 1 redhead; (c) 1 black duck.
(3) May not include more than: (a) 4 wood ducks; (b) 1 canvasback or 1 redhead; (c) 2 black ducks.
(4) May not include more than 1 hooded merganser.
(5) May not include more than 2 hooded mergansers.
(6) A special bonus bag on scaup ducks shall be allowed during the period November 20, 1971 through January 18, 1972, with a daily bag limit of 2 and possession limit of 4, in addition to the regular bag limit on ducks. This bonus bag limit, however, shall apply only in coastal waters designated as commercial fishing waters east of U. S. Highway No. 17; except that this special bonus bag limit shall not be allowed in Core Sound between Drum Inlet and Harkers Island, nor in Pamlico River upstream and west of a line between Pungo River and Goose Creek, nor in Currituck Sound north of U. S. Highway No. 158.
(7) A special bonus bag on blue-winged teal shall be allowed during the period November 20 through November 27, 1971, with a daily bag limit of 2 and possession limit of 4, in addition to the regular bag limit on ducks.

A Summary of U. S. Fish and Wildlife Service Regulations Applying to North Carolina.

Issued by the North Carolina Wildlife Resources Commission.
September 1, 1971

About Those Blues....

Call him, chopper, snapper, or whatever, the bluefish is something apart from most fish. Late fall is a great time to try for this appetite with fins.



• It wasn't a very good suit. Still, there was no good reason for wearing it to the beach. And even less for not changing into beach clothing when we arrived. Some years ago the *Saturday Evening Post* had a cover showing the arrival of a family at their beach cottage, Whispering Sands. Husband gets out of car, collects tackle, enters one door, exits from other door and casts into surf, while wife stands furiously by loaded station wagon with c h i l d r e n whining all around. Women are so unreasonable.

Getting back to my story, at least I unloaded the baggage before I made my first cast. But I didn't know about bluefish. Even in July the blues will come into Topsail to commune with the fishermen. And a light bass rod is hardly the weapon with which to tame a four pounder. Blue lightning struck the rod and I lurched forward into the water. I thought my wrist was broken. Eventually it dawned on me that I had a fish on and that it should be brought in. After something of a rumble, it came along. You only need to catch one like that to become a believer. My suit was never quite the same afterwards. Neither was my fishing.

It is probable that the bluefish doesn't even know that his name is *Pomatomus saltatrix.* Nor care. He's that kind of creature. As long as there are baitfish, especially menhaden, available and the water is neither too hot (above 80°) nor too cold (below 56°), he's happy just slashing through the schools cheerfully amputating their tails and then gulping them down in leisurely fashion. Lovely chaps.

His distribution is world-wide, with concentrations on the east coast of South America, most of the African coast, the Malay Peninsula, the Black Sea, and Australia-New Zealand. T h e more one reads about bluefish, the heavier they become. Tar Heel anglers went berserk when Joe Menzaco caught a 21½ pound blue from the surf in 1967. From there things have improved. Joe himself caught one of better than 22 pounds in 1969. Numbers of fish in the 15-20 pound class have been caught. Up north, a 24¾ pound fish was landed off of Montauk in 1968. Massachusetts claims a 27 pounder for the year 1963 and a 25 pounder for the year 1874. Commercial fishermen from North Carolina's coastal villages report seeing fish that would weigh 35 pounds lying well off the coast in winter. Their nets have taken large blues, but none this large. One outdoor writer reports fish of 40 pounds off the coast of Morocco, and another tops him with one of 45 pounds somewhere else along the African coast. Where all this talk will lead is anybody's guess. Probably back to the ocean.

The subject of the bluefish cycle has been of interest to saltwater anglers for many years. It is usually described as a seven-year cycle. To understand it, it is first necessary to look at what is known about the movements of these fish along the Atlantic coast. Marine biologists now believe that there are two and possibly three races of blues along our coast. Cape Hatteras seems to be the dividing point between northern and southern strains, with a possible third race off the Florida coast, perhaps extending into the Caribbean Sea. The three races mix frequently, their spawning grounds and spawning seasons being the basis for separation. Southern blues spawn in the spring. Their young move north with the Gulf Stream to the New Jersey-New England area. Northern blues spawn in the fall, and their young move south to winter beyond Hatteras.

In addition, there is a lot of east-west movement between the sounds and estuaries and the continental shelf. For example, it was mentioned that commercial fishermen frequently sighted large blues far out at sea off Hatteras in winter. Then came the winter of 1968. First the netters and then the surf fishermen tangled with large blues with the netters taking the prize at 19 pounds. All told, they took 15,000 pounds of blues during the run of February of that year.

The largest caught in the Hatteras surf weighed 14 pounds. At about the same time, giant blues were seen in the Pamlico Sound. At least one was snagged, weighing 15½ pounds.

All of this points up a very complex series of movements. And it is this very complexity, combined with the ravenous appetites of the fish that has led to the apparent cyclic nature of blues. All of nature is to some degree cyclic. In the case of bluefish, however, there have been periods when they seemed to drop completely out of sight. Examples of this would be the periods around 1765, 1810, 1900, and 1940 along the northern coast and 1880 along the Carolina coast. Following a period of no bluefish, they will once again begin to increase in numbers over a period of several years. We are in such a phase now. No one knows when it will end, nor is it known what will bring it to an end.

At one time it was thought that bluefish cycles alternated with those of weakfish (sea trout), one cycle being high when the other was low. There is little evidence for this, however. It would be more in keeping with biological cycles if menhaden populations controlled the bluefish cycle, but again evidence is lacking. But it is the general feeling of biologists that the fish do not simply die off from eating out their food supply, but rather modify their habits and locations until the baitfish can once again repopulate the coastal waters. A great deal remains to be learned about them.

There are a few facts that are useful to saltwater anglers. Bluefish are visual feeders, seldom eating much at night. And although they will stop feeding when glutted with baitfish, they will resume feeding if something bigger than the baitfish they have fed upon comes into view. Larger plugs may provide the stimulus. Biologists have found that bluefish, like some other species, will ease off feeding as temperatures drop below 56°, but blues will then go on one last feeding binge at 54.5°. This may explain the Hatteras blitz of 1935, one of the most dramatic saltwater events ever witnessed. People who were there say the surf was a solid living mass of bluefish, driving the baitfish up on the beach. It could happen again this year, or any year while they remain in our waters.

It is said that bluefish are 38 percent edible meat. I don't know about that, but it's certain that they are 100 percent game. There's nothing quite like them. ▲▼ **by R. Wharton Gaul**

Bluefish Records

• Bluefishing along North Carolina Outer Banks is one of the most challenging sports for any salt water angler. Bluefish (Pomatomus saltatrix) average two pounds in weight. The bluefish is known by several names (Blue Snapper-Flatback-Tailor-Greenfish-Skip Mackerel-Snapper Mackerel) but in North Carolina we call them *"blues."* The fish is a greenish iridescent blue shading off to silver at the sides. The pectoral fin is gray-black at the base. This species is the only one of its kind in the family and is the most gluttonous fish in the water and may often be referred to as a fin-covered chopping machine. It makes excellent eating and is a sportsman's favorite. The largest ever caught by hook and line (single hook) weighed 24 pounds, 3 ounces; it was caught by M. A. da Silva Beloso on August 27, 1953 near San Miguel, Azores.

The North Carolina coastal waters also produce large blues. A 22 pound, 12 ounce giant was caught on November 11, 1969 by Joe Menzaco, Point Harbor, North Carolina. Mr. Menzaco's fish is a world's record for a 20-pound test line and is recognized by the International Game Fish Association (IGFA). On November 23, 1969, Horace Midgett, Camden, North Carolina, also caught a 22 pound, 12 ounce blue while surf fishing near Rodanthe, North Carolina, (Dare County). However, Mr. Midgett used a treble hook while Mr. Menzaco used a single hook (treble hooks are not recognized by IGFA but by FIELD & STREAM magazine and the Research and Development Section (Sports Fisheries Studies), of the Division of Commercial and Sports Fisheries, North Carolina Department of Conservation and Development).

This year, we again see these giant blues making a run along our coast and an additional world's record has been broken. This time by a woman. Yes, Mrs. John Corley, Fayetteville, North Carolina, was fishing from the Outer Banks Pier and Fishing Center, Nags Head, North Carolina, on November 19, 1970, when she hooked and landed a 20 pound, 4 ounce blue (single hook—Hopkins Lure) on a 20-pound test line. If recognized by IGFA, then Mrs. Corley will set a *"20-Pound Test Line Record for Women."* The current IGFA 20-pound test line record is a 14 pound, 10 ounce blue caught off Cape Cod, Massachusetts, October 11, 1957 by Jeanne M. Brauneis. A new test line and state record (both IGFA and North Carolina) has been set by Joyce Payne Bell, Manteo, North Carolina. She was fishing from the charter boat "Gypsy Angler" on November 19, 1970, when she landed a 23-pound, 15-ounce blue on a 40-pound test line using a "hoochy-troll" with a single hook. The IGFA record is 19 pounds, 4 ounces, caught off Long Island, New York, on October 19, 1958 by Elanor Plasko.

Still another North Carolina test line record on bluefish was set by a man, Mr. Joe Lamb, Jr., Kitty Hawk, North Carolina. He caught a 22 pound blue from the Nags Head Fishing Pier on November 17, 1970, using a 12-pound test line (Hopkins Lure,

• continued on page 26

A STREAM IS FOREVER?

by Rod Amundson

WHEN Samuel Taylor Coleridge wrote the lines "Water, water everywhere, nor any drop to drink" he little realized he was prophesying the day when fresh water would have to be run through a series of chemical processes before it would become again fit for human consumption. Someday, the seawater about which Coleridge wrote will have to be processed to meet the growing demand for fresh water.

The phrase "pure water" brings to mind images of crystal-clear springs emanating from a mountainside, gurgling from the shade of a forest glade, or raindrops pattering on fresh-washed leaves of early summer. But pure water, like complete vacuum, does not exist in nature.

However distilled, filtered or otherwise refined, water is never pure. It always dissolves or absorbs molecules of any matter it touches. To this extent it is the Universal Solvent. Chemically, water is the simplest of natural resources. It is composed of two atoms of hydrogen combined with one of oxygen; it melds with multitudinous forms of minerals—and into the metabolism of all forms of life.

We cannot live in water, literally, and we cannot live without it. Yet we pollute it, abuse it, contaminate it, and go blithely on in the belief that in useable form it will be with us forever. Properly used, water will sustain human and all other forms of life. Abused it can destroy the life it originally nurtured.

"Pure as the driven snow," a snowflake falls on the branch of a balsam fir atop Mount Mitchell. There it is joined by a million others, each containing countless molecules of water. Some of these molecules evaporate into the atmosphere from which they came. Others stay frozen until spring when they melt, drop to the ground, and begin to form a stream.

As long as it rains or snows and as long as water runs downhill we will have springs and wells and brooks and rivers. Human technology cannot alter this truth; but what fearful havoc this technology can wreak upon the watersheds that streams create. In remote sections of our mountains there are yet a few springs and brooks with water still pure enough to drink—water as pure as nature can produce it. But from there on down to the sea this pristine purity is being ravished by pollution and contamination.

A living, meandering stream has become a raw, straight ditch. Not all such projects have resulted in calamities like this, but many have. Is this what we want? Yours is the next move.

A logging road is gouged out of the side of a mountain, and a trout stream begins to die. A cloudburst inundates a city, an inadequate sewage treatment plant is flushed, and miles of fish are killed in a major river. A manufacturing plant sets up operation on the bank of a stream. Streams are natural sewers, aren't they? So why not just dump the wastes (including lethal quantities of organic heavy-metal compounds) into this natural sewer and let nature take its course?

Nature *will* take its course. It will submit to misuse and abuse just so long; then it will turn upon the abusive forces and destroy them. And it may someday destroy the puny, intellectual bipeds that put these forces into motion. A stream is a living thing, and at the same time a giver of life. It can be killed, and upon dying, putrify and kill again! Or living, it can bring forth new life.

In their natural state, streams are constantly changing: Altering, but never destroying, their natural surroundings. Only people do this. They build roads carelessly. They start forest fires that denude watersheds; they overgraze grazing land and overcultivate crop land; they overcut timberland. They build dams, bridges, cities, drainage canals, and some of the older people think back to the days when you could get a drink of water that wasn't so full of chemicals it would kill fish.

What Are Watersheds?

The dictionary defines a watershed as the whole region or area contributing to the water supply of a river or lake. But it doesn't say that most lakes have outlets that go on down a watercourse that in itself is part of another watershed, or that lakes—natural or impounded—eventually become marshes and dry land.

Look at a topographical map. Such a map of North Carolina would start at the top of Mount Mitchell with a small dot indicating an elevation of 6,684 feet, the highest point east of the Mississippi. Below this are concentric lines indicating lower levels of elevations. These terminate at mean sea level—in the sounds and the ocean itself.

This does not mean that all streams in our state originate at the top of Mount Mitchell simply because of its elevation. Streams begin at the highest point of land in any given area where moisture falls from the atmosphere. At this point and others nearby, a watershed begins. It and the streams it created, end at sea level.

Most of North Carolina's stream systems flow directly into the Atlantic. A few drain into the Mississippi River system and eventually the Gulf of Mexico. Except for the results of logging roads, a

few mining operations, and highway construction, the water in these runs out of North Carolina before it can be badly polluted by North Carolinians. The rest, however, tell another story. They suffer from the ravages of agricultural, industrial, and municipal pollution.

To illustrate this, let's dip a theoretical glass of water out of the Neuse River where it joins the Trent at New Bern. Remember, this glass contains billions of molecules of water. The water in it will be reddish gray because of silt washed in from farms and housing projects and road building upstream.

Take the glass of water to a chemistry laboratory. Here you can run it through a paper filter and get almost all of the silt out of it. The water is clear now, but you won't dare to drink it because it contains dissolved sewage, assorted pesticides, and the organisms that cause typhoid fever and other infectious diseases. A few drops of chlorine compound will kill the bacteria, and the pesticides won't be absorbed into your body to any dangerous degree.

The glass of water will now be fit to drink, but a goldfish couldn't live in it; too much chlorine. After the water has been nicely chilled in a refrigerator, take it out and hold it up to the light. It is crystal clear, and beads of moisture form on the outside of the glass. But before you take a swallow, remember this: at least a million molecules in that water have been flushed down at least half a dozen toilets upstream!

Stream Improvement

The obvious and perhaps most expensive means of improving North Carolina's streams is the elimination of pollution. This will probably never be entirely accomplished, but North Carolina is a leader among states in its pollution abatement program and although significant improvements are being made there is still a long way to go. It will take years and hundreds of millions of dollars to bring our streams back to a condition remotely resembling their original condition, or at least to a point where we can live with them.

There are forces at work today under the guise of "Stream Improvement" that cause ecologists and conservationists to have anguished nightmares. These forces involve neatly labeled activities called "Stream Channelization" and "Flood Control." But in practice, operational projects under these labels make the proverbial wolf in sheep's clothing look like a lamb in silk pajamas.

In the southeastern states, two major federal agencies are involved in stream improvement. These are the Soil Conservation Service and the U. S. Army Corps of Engineers. In the southwestern part of the country the Bureau of Reclamation and the Bureau of Indian Affairs have gotten into the act.

The key word to the whole fiasco is "Channelization." Natural streams have always had channels, and these channels have always done an acceptable job of returning normal precipitation back to the ocean from whence it originated, and without doing any irreparable damage to the environment through which they flowed. Not any more.

A farmer in Duplin County lost a couple of acres of soybeans adjacent to a swamp because heavy rains caused a flood. The same thing happened to several of his neighbors. Since none of these people had any control over weather, they appealed to the Federal Government for help. (The Federal Government has a reasonably efficient weather reporting service, but it has not yet learned to control weather.)

But some other things happen. The water table falls and wells go dry, and those extra dollars in the bank have to be withdrawn to pay for digging deeper wells. Not much profit there, really. Meanwhile, Gloomy Creek, which once meandered slowly and darkly through Gloomy Swamp is now a smelly, dirty ditch. The largemouth bass, chain pickerel, redfin pickerel, warmouth bass, and other gamefish species went on down Gloomy Creek with the last few gallons of dark water that were drained when the bulldozers and draglines and Stream Improvers finished their work.

Gloomy Swamp, whose flat ground surface was once covered with water during most of the year, has gone dry. Huge cypress, tupelo gum, and other hardwoods, have died of thirst. Wood ducks that used to nest in their hollow cavities have gone elsewhere in the hope of finding a new place to breed. And local landowners begin to wonder if a few acres of soybeans are worth more than a few thousand board feet of hardwood so precious it is used for veneer on expensive furniture.

Swamps, and the creeks and rivers that flow through them, are not the only target of the Stream Improvers. In the composite eyes of one federal agency—this one military—any stream capable of floating a boat needs to be straightened, dredged, dammed, and channelized. To Hell with environment; people need shipping lanes, hydroelectric power, flood control, and the purgative therapy of tax paying.

During the past three decades more money has been spent on flood control projects than was spent in the preceding history of the United States. But the annual bill for flood damage is higher than ever before! Why? People continue to build homes and towns and factories on fertile flood plains that have been flooded by streams since time immemorial—and will continue to do so as long as economy takes precedence to ecology.

The late J. N. "Ding" Darling, a syndicated cartoonist, once depicted a huge power shovel scooping through a stream and ripping trees out of the side of a mountain. The cutline of the cartoon read, "When all of our natural resources are converted to cash, what are we going to eat?"—a fitting commentary on what, four decades later, we are doing to our environment. ⬍⬍

The Mystery and Wonder of Migration

PART 1

by Charlotte Hilton Green
Photos by Jack Dermid

But the night is fair,
And everywhere
A warm, soft vapor fills the air,
And distant sounds seem near;
And above, in the light
Of the star-lit night,
Swift birds of passage wing their flight,
Through the dewy atmosphere.
"Birds of Passage" Longfellow

SINCE first he watched birds, man has pondered their disappearance in the fall and their appearance in the spring. . . Even Jeremiah (VII): "Yea, the stork in the heavens knoweth her appointed time; and the turtle (dove) and the crane and the swallow observe the time of their coming."

And today's ornithologist: "Migration is the traveling of some birds between their summer and their winter homes—a journey between a definite breeding ground and a definite wintering area. This may be the same sanctuary, marsh, or stream —or even your own backyard.

In memory, I see myself, a child of ten, perched in a favorite lookout tree. The sun is sinking in Lake Erie, burnishing the tops of the tents of the gypsy camp by the lake. Each evening the child climbed to the lookout to listen to the faint tinkle of the guitars, and to watch, with a strange unrest,

Restless Canada geese, feeling Nature's mysterious urging, take to the air for a nesting site that perhaps they have never seen. Migration patterns are fairly well known, the reasons and mechanics for the trips are still unsolved.

the drama of that wild, free life, for regularly, spring and fall, the gypsies in their migrations camped in this grove.

Suddenly she heard a faint, far-off *honk-honk* and glancing toward the South she saw a V-shaped wedge etched against a copper sky—her first glimpse of "wild geese flying high"—and she watched them until they disappeared into the strange, mysterious North.

Wild geese! Whence had they come? Whither were they going? A strange restlessness seized her. She, too, longed to be winging over unknown lands, into that mysterious North. Suddenly the thought came to her, *"The geese, why, the geese are gypsies too—only they are gypsies of the skies!"*

Years later, in the South, where she was to spend her adult life, and to become a serious bird-watcher, she helped found the Bird Club movement in the Carolinas. And she was interested in, and wanted to know more about, those sky highways along which myriads of birds travel regularly to and from their summer breeding grounds in the North to their winter resorts in the South.

Today her southern garden, yard and woodland is a "Backyard Sanctuary" where throughout the year various birds feed, woo, nest, bathe and drink in the bird bath, and lighten our days with songs and flash of wings. There was a year when a few summer residents—a wood thrush, a tanager, and a ruby-throated hummingbird—arrived back at their old "home grounds" before some of the winter birds had departed. Thus the hummingbird, that may have wintered in Central or even South America, and a slate-colored junco, that may have come down from a summer in Alaska, met to exchange a "winged Howdy" in my garden.

"Migration of birds," says Frederick C. Lincoln* biologist of the U.S. Fish and Wildlife Service, and authority on migration," were probably among the first natural phenomena to attract man's attention and intrigue his imagination; recorded observations date back 3,000 years to the time of Hesiod, Homer, Herodotus, Aristotle and others."

Long before that Paleolithic man had made drawings of birds on the walls of caves in France and Spain. Even the Biblical Job and Jeremiah noted the flights of birds and observed the time of their comings and goings. The Arabs and Persians based a part of their calendars on the time certain birds disappeared during the year, and some American tribes of Eskimos called October "the month of the flying away," and April and May "the coming of the geese."

Before scientists and ornithologists had made a study of migration (and this has been greatly advanced through banding) there were many quaint legends and myths concerning its seeming mysteries. In the Middle Ages people believed that certain birds hibernated in the mud during the winter months. Ridiculous as the hibernation of birds may seem, there *is* an authentic record of a *poorwill** in California, which *did hibernate,* but in a rock crevice, not in mud.

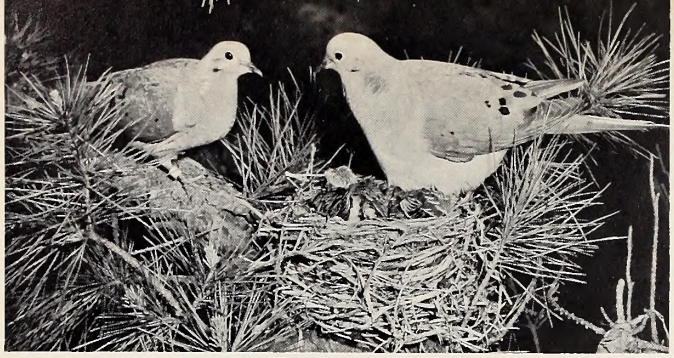
Another theory was that small birds sometimes migrated on the backs of large friendly birds, hitchiking, as it were, on storks, cranes and such. But perhaps the most astonishing belief was that some birds wintered on the moon! (Winged astronauts, they would have been!)

Scientific study of migration really began with banding (the English call it "ringing") birds. "Banding permits are issued by the U.S. Fish and Wildlife Service, Washington, D. C., which also supplies the bands, each aluminum band has a serial number and 'Notify Fish and Wildlife Service, Washington, D. C.' If found on a trapped bird, send the number, species of bird, where and how taken, condition, to the Service, and you will receive back information where and how bird was banded. On bird found dead, or killed in hunting, either send in band or serial number, and information."

Today most game bird banding is done by Bureau biologists (and assistants), while that of perching birds is done mostly by well-trained amateurs who hold permits (which, however, are difficult to get). "Something over thirteen millions birds, of about 600 species, have been banded, and about a million recoveries have been turned in." Americans and Canadians use the same bands, for many of our

* *Migration of Birds,* Circular 16, Frederick C. Lincoln, Fish and Wildlife Service.

* Poorwill Sleeps Away the Winter. *The National Geographic.* Feb. '53. Also *THE BIRDS.* page 100.



The mourning dove on the left still wears the leg band placed there when the bird was either trapped or banded as a nestling. The return of such bands helps biologists unravel the travels of migratory birds.

birds migrate through both countries. The central banding service is now at Laurel, Maryland, where all administrative work is done."*

"Birds shot by sportsmen are reported oftener than others, for they die where someone can remove the bands and report them, and too, more and more are sportsmen realizing the long returns of conservation. From all this information, gathered little by little and often under great difficulties, we have learned something of the real—and often extraordinary—facts about migration. Yet there is so much, so much, we do *not* know!

Migration, of course, is not limited to birds. Other animals, such as caribou, reindeer, the bison of yesteryear, salmon, shad, eels, and even some insects—have their patterns of migration, probably built up through thousands of years. Every autumn the monarch butterfly migrates southward in great swarms. (See "Flight of the Monarchs", Oct. '71 "Wildlife") I have seen them at Cape May, New Jersey, and more recently, at Swift Run Gap, in the Appalachians. But the vast hordes go to California, a famed winter place for them is at Capistrano.

Migration, then, is a wondrous, mysterious event that takes place *without fail* up and down much of the continent, *twice each year*. Why and how? What are the mysterious forces that send a tiny hummingbird, no larger than one's thumb, to fly, perhaps, across 500 miles of open water of the Gulf of Mexico, to some winter home in South America? On the other hand, some ruby-throats are satisfied to winter along the Gulf Coast and to nest, it may be, in our southern gardens. Or one might go north as far as Saskatchewan to establish its summer home. Again, why, WHY?

Why migrate, anyhow? That is a question that always intrigues the novice in nature lore. One can understand a bird's wanting to leave cold northern lands for warmer ones, to seek regions where food is plentiful. But why should some sturdy fellows like the robin and the sapsucker migrate, while mites like chickadees, titmice and kinglets brave a winter's sometimes ice and snow in our Carolinas? Part of the answer is food. But not all. *"WHY* do some birds leave their winter homes just at the time of greatest abundance in plant and insect life, often to be overcome on the northern flight by bitter winds, cold, and storms?"

In his classes at Cornell University's Laboratory of Ornithology (also in his *The BOOK OF BIRD LIFE*, p. 119) Dr. Arthur A. Allen told us: "The migrating instinct is closely associated with the enlargement and reduction of reproductive glands, a physical cycle which, under normal conditions, is just as regular as the pulsing of the heart and records time as accurately as a clock. With most species the organs of mature male birds begin to enlarge before those of the females. Because of this the males arrive first and are followed by the females and later by the immature males."

(And yet another theory, "some recent evidence indicates that the pituitary gland is a primary regulator of both migration and reproductive glands. Many birds begin migrating while reproductive glands are still small.")

Lincoln points out there are two common theories of migration. One, in earlier geologic ages, with food and suitable breeding conditions and year-long food supply, with the coming of the Ice Age the glacial fields and cold advancing southward forced the birds before them, until finally all bird life was concentrated in southern latitudes. As the ice eventually retreated, each spring the birds whose ancestral homes had been in the North returned, only to be driven southward again at the approach of winter. As the glaciers retreated farther and farther north, the birds followed them, most of them returning southward each winter, and as the climate became established, so apparently did the habit of migration.

An opposite theory is that of the southern ancestral home, its premise being that the original home of all birds was in the Tropics, but as that area became overpopulated, there was a spreading out to seek more living space. Those species that went north were kept in check by wintry conditions there, and so had to return southward each year as that season approached. Gradually, as ice in the North kept retreating, new regions became available for summer ranges, but approaching winters still meant "Southward Bound" for many birds.

Thus a pattern may have been built up, and this has become such a normal way of life that many species spend very little time in their summer breeding grounds, often leaving as soon as the young are on their own but before they are able to migrate.

Of course, one must remember that these are theories of migration, and may be modified tomorrow in the light of further scientific study and research. However, as Lincoln points out, "It is apparent that whether the ancestral home of any species was at the northern or the southern limits of its present range, or in some intermediate region, the search for favorable conditions under which to breed in summer and to feed in winter has become the principal factor underlying the origin of migration."

* WILD SANCTUARIES, page 42

THE MOST LOGICAL FROG©

by

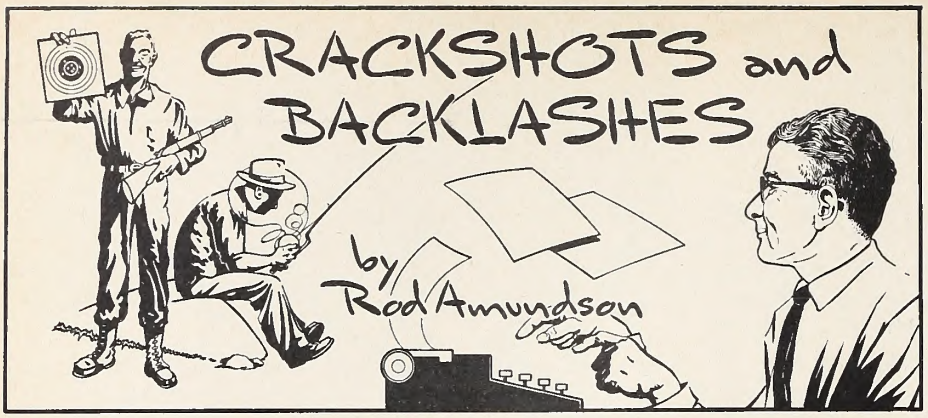
JANE & DERRY WALKER

HI, BOYS AND GIRLS!

THOSE RACCOONS ARE LOOKING FOR SUPPER. THEY WILL EAT JUST ABOUT ANYTHING— INCLUDING ME! RACCOONS SLEEP MOST OF THE DAY IN THEIR DENS WHICH ARE OFTEN FOUND IN HOLLOW TREES. THEY HUNT AT NIGHT, AND THAT MAKES ME NERVOUS, FOR THEY GET MUCH OF THEIR FOOD FROM PONDS. THEY LOVE CORN, TOO. YOU CAN FIND THEM AROUND CORNFIELDS AT NIGHT. DO YOU KNOW WHAT RACCOONS DO BEFORE EATING THEIR FOOD?*

L.F.

* THEY WASH IT— WHEN WATER IS NEAR BY.



With the pleasure boating season almost over, North Carolina has had a total of 70 boating accidents.

This figure is not of earth-shaking importance, when you consider that nearly 80,000 boats have been registered, and about an equal number of power boats unregistered.

But the tragic story is that of these 70 accidents, 24 were fatal. Even more tragically, all but one of the deaths occurred by drowning. One person was killed when he was struck by a boat. Odds are about 100 to 1 that the others could have been saved if they had been wearing, or had easy access to, life saving equipment.

Ten of the deaths resulted from the simple fact of falling overboard. Nine resulted from boats capsizing. One person drowned when he fell overboard trying to start his motor.

Only four deaths occurred in Piedmont reservoirs. There were no fatalities in the mountain lakes or reservoirs. These are relatively new impoundments where you would expect boaters to be less experienced in the activity of boating.

All of the rest of the fatalities occurred in the eastern part of the state where boating and fishing have been a major activity for generations.

What kind of boating activity was being engaged in when the fatalities occurred? Most were fishing, cruising, or drifting—which would obviously seem to be the safest kind of boating activity. One victim was racing; another was trying to pull a dog into his boat.

None of the boats involved was more than 16 feet long. Most were in the 12-14 foot class. The ages of the victims ranged from six years to 70. Most were in the prime of life.

The sport of water skiing, spectacular and seemingly dangerous, probably had more to do with getting the Boating Safety Act of 1959 passed by the General Assembly. But only one of this year's boating fatalities had anything to do with water skiing. A six-year-old boy fell out of a boat that was towing a water skier. Records over the years indicate water skiers are much more careful than the sedentary, middle-aged fisherman who falls overboard and drowns.

* * * * *

Poor Fish

The gull swooped down to get a fish
You see it is his favorite dish.
The air was clear, the day was cold
The gull was hungry and very bold.
He smacked his beak with keen delight
As the fish came to eternal night.

Grace Oliphant

* * * * *

TURKEYS

• continued from page 7

cessful hunter to report his kill to the Commission.

• Seek a solution to the problems resulting from the release into the wild of pen-raised game farm or domestic turkeys of any origin.

• Support State and Federal purchases or leases of lands that can be managed for turkey hunting.

• Support the state's game laws and see that your companions do likewise. Those laws are for the purpose of perpetuating the resource and to give every hunter an *equal chance* to partake of the available surplus.

• In order that the *quality* of human life may be improved, that there may always be sufficient wild places left in our land for the maintenance of wild turkeys and the immeasurable pleasures they afford us, support those programs, policies and organizations that strive peacefully to control the growth of the human population and its consequent demand for more roads, factories, homes, dams and the similar pitfalls of "progress." ⬍⬍

BLUES

• continued from page 19

single hook).

Within a two-day period, North Carolina anglers broke three North Carolina and three IGFA records. All of the above record catches have been submitted to IGFA for final recognition by Mr. Aycock Brown, Dare County Tourist Bureau, Manteo, North Carolina. Let's hope IGFA will give North Carolina recognition as accepted and approved by our Sports Fisheries Studies of the Division of Commercial and Sports Fisheries, North Carolina Department of Conservation and Development.

As in previous years, we again find Mr. Joe Menzaco, Point Harbor, North Carolina, an ardent fisherman. On November 20, 1970, Mr. Menzaco was surf fishing near Duck, North Carolina (Dare County), using a 12-pound test line, single hook, when he caught and landed a 23 pound, 6½ ounce bluefish. The world's record bluefish of 24 pounds, 3 ounces was caught on a 12-pound test line off the Azores. It appears that this year the North Carolina coast produced the largest blues caught by anglers along the Atlantic Coast and missed the world's record by only ounces.

Yes, the big blues are running. ⬍⬍ **Mac McBryde**

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Wildlife Art Show and Sale Scheduled

Larry Windt chats with one of the many people that enjoyed the exhibit last year. The display promises to be of even better quality this year.

PHOTO BY LUTHER PARTIN

• North Carolina sportsmen and all those who appreciate our great out-of-doors, will have an opportunity again this year to see some of the best original wildlife artwork produced in this part of the United States. The Third Annual North Carolina Wildlife Art Exhibit is being sponsored again this year by the Wake County Wildlife and Sportsman's Club. This event which was so highly successful last year, is being held December 2, 3, 4 at the North Hills Shopping Center in Raleigh, and will be open to the public daily on these dates.

The exhibition last year displayed the works of some 29 Tarheel artists, and included over 80 paintings, drawings, carvings, and photographs. The interest shown by the public and other artists indicates that an even bigger and better show is assured for this year. Seven general categories are listed for entries: oils, watercolor, acrylic, drawing, prints, sculpture (including wood, metal and ceramic), and a special photographic class.

The sponsoring Wake County Club urges interested artists to write: North Carolina Wildlife Art Exhibit, P. O. Box 12033, Raleigh, N. C. 27605, for information and entry blanks. There will be a $3.00 per artist fee to cover handling expenses for all entries. Handsome engraved plaques will be awarded for first places in each of the artwork categories, and the best in show painting will be selected to appear on "Wildlife in North Carolina" magazine during the coming year. A fee of $100 will be paid the winning artist by the Wildlife Commission for one-time use of the work. The original painting will be returned to the artist.

One of the main purposes of the exhibit is to build a scholarship fund for a deserving North Carolina student entering a curriculum of wildlife management or an allied field. In order to do this, the sponsors are asking each artist to donate 20 percent of his total to this scholarship fund. Each artist will price any or all of his entries for sale during the exhibit, and these transactions will be handled by club officials.

On the cover of this month's magazine is last year's best of show winner by Mike Smith. Similar high-quality entries are expected this year, and the display promises to be an exciting event for artists and the viewing public alike. The purposes outlined by the Wake County Club, in addition to the establishment of the scholarship fund, are: to promote more interest in our wildlife heritage; to bring attention to some of North Carolina's finest artists, the wildlife artists; and to give the public a chance to purchase works that seldom are available for sale at any other time.

Mark the dates of this event, December 2, 3, and 4, and plan now to attend. If you are an interested artist, inquire right now; deadline for receipt of **entry blanks** is November 25, 1971. ⬍

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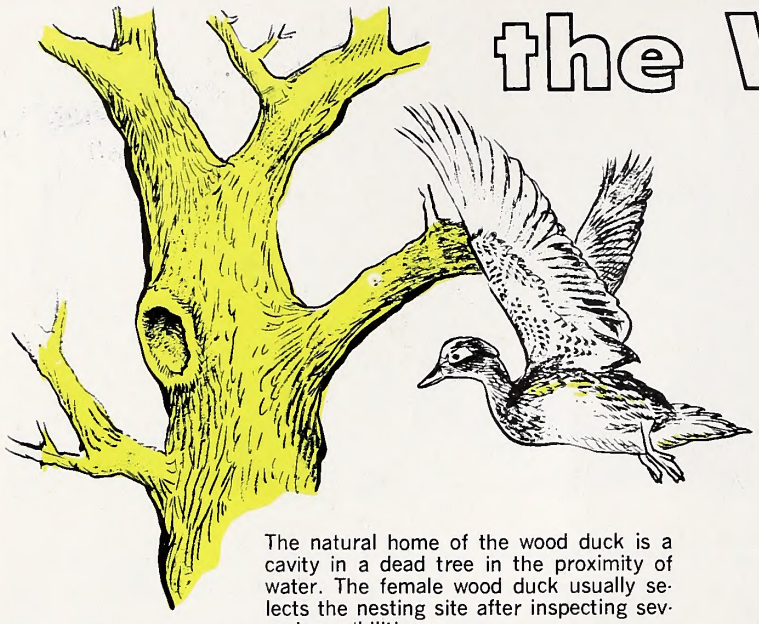
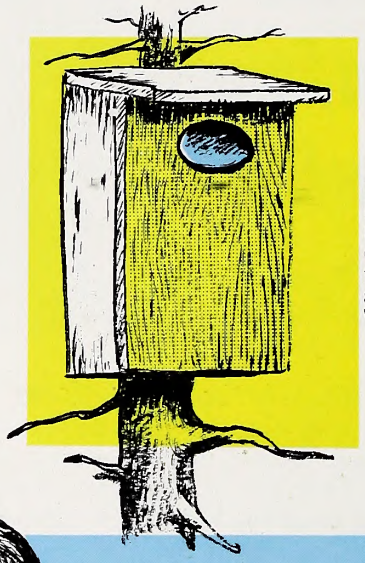
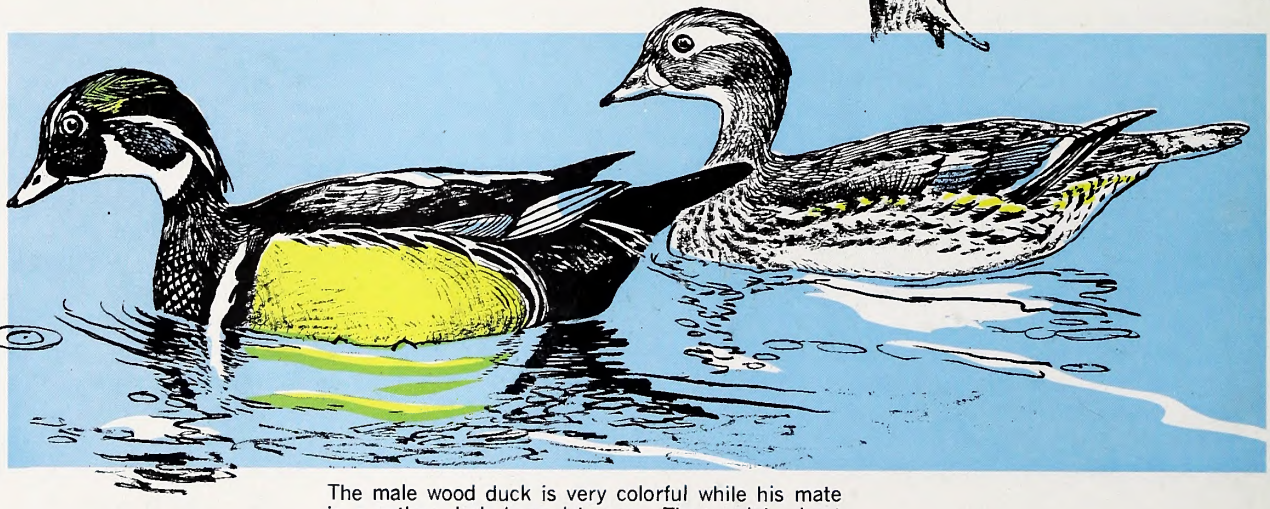
the Wood Duck



The natural home of the wood duck is a cavity in a dead tree in the proximity of water. The female wood duck usually selects the nesting site after inspecting several possibilities.



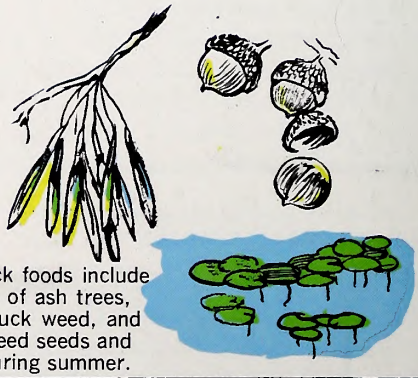
Hollow tree homes are becoming very scarce and the wood duck needs help in the way of nesting boxes. Plans for a wood duck box are available from the Wildlife Commission.



The male wood duck is very colorful while his mate is a rather drab brownish gray. They weigh about 1½ pounds.

Young wood ducks leave the nest within 24 hours after they are hatched, never to return to it. They will be flying at the age of 8 or 10 weeks, and will be ready for migration by the time fall arrives.

D. RAVER



Wood duck foods include the seeds of ash trees, acorns, duck weed, and various weed seeds and insects during summer.

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Praises of Nature

by Nell Lewis

Bowing low before their King
Nature's children stop to sing
Praises of the Christ Child borne
Long ago upon that morn.
Showing forth their adoration
By their own continuation;
Faithful still to their great master
In overcoming stark disaster
Of the wasting of our land
Rendered carelessly by man.

STATE OF NORTH CAROLINA

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GOVERNOR

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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VOL. XXXV, NO. 12 DECEMBER, 1971

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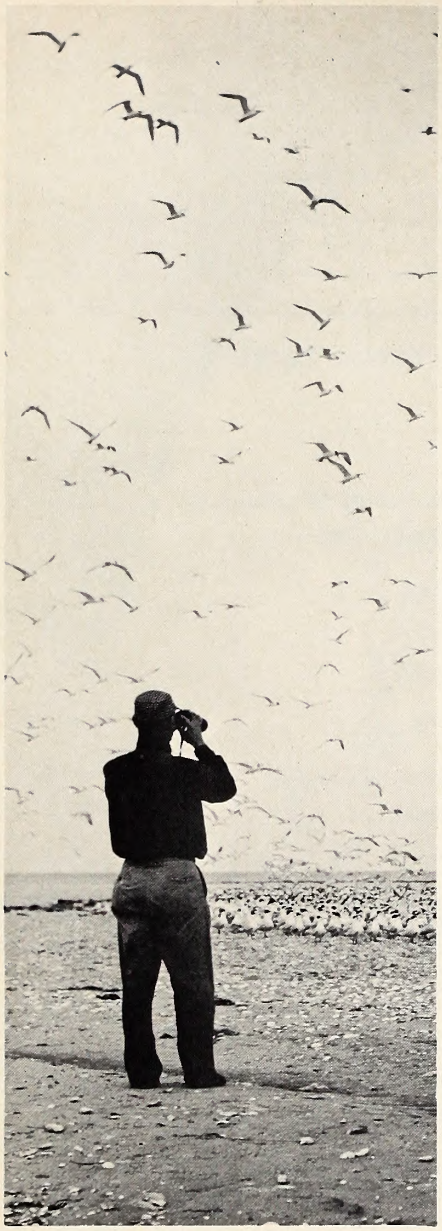
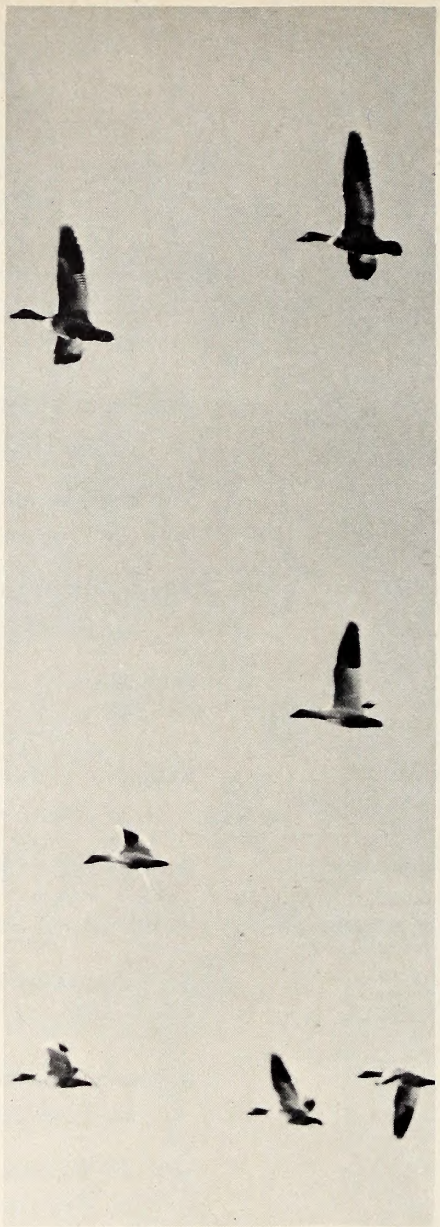
JIM DEAN _ _ _ _ WRITER-PHOTOGRAPHER

The beaver has been labeled "Nature's Engineer," arduous, industrious, and many more complimentary things. Most of the phrases fit this flat-tailed water mammal. The farmer whose lowlands are flooded by a family of the eager fellows may not be quite so kind with his descriptive comments, but the beaver is, none-the less, a very beneficial water conservationist. They are not widely distributed over the state, but seem to be increasing slightly. Painting by Kent Pendleton, Denver, Colorado.





The Mystery and Wonder of Migration

CONCLUSION

by Charlotte Hilton Green

● Migration of birds is unevenly distributed, although there are probably few places in the country where there is none at all. It has long been realized that there are several great ancestral routes of skyways—or "flyways" but in 1935, as a result of studies of banding data, Lincoln pointed out "the existence of the now accredited *four great flyways,* presumably thousands of years old. One follows the Atlantic Coast, another the Mississippi Valley, a third through the Great Plains and a fourth along the Pacific Coast. Although this study was confined mainly to waterfowl, there is much evidence that most migratory birds generally stay within their respective flyways."

(Actually, it is also conceded, many waterfowl switch from one flyway to another in their travels. Also "In recent ceilometer accidents at airports thousands of migrating birds were killed at such places as Macon, Ga. and Nashville, Tenn., which are *not* on the flyways.)

"The present concept of a flyway," says Lincoln, "is that of a vast geographic region with extensive

Many living creatures, including man, migrate for various reasons and at various times. Much of it still remains Nature's mystery.

breeding grounds and more concentrated wintering grounds connected by a more or less complicated system of migratory routes."

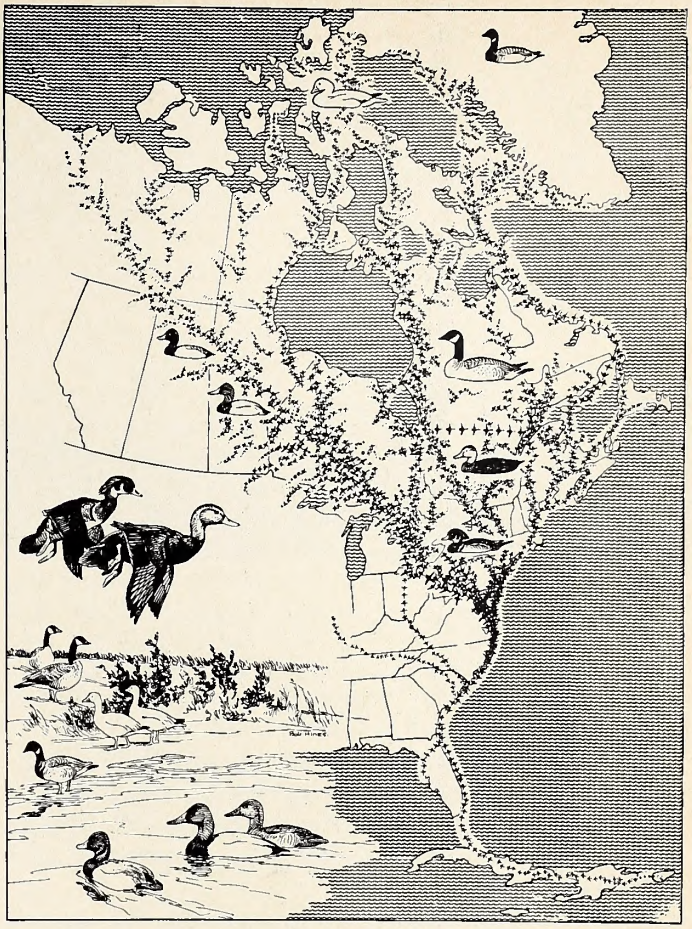
Here in Carolina we are more concerned with the Atlantic Flyway, "which follows the Atlantic Coast from the top of Maine to the southernmost tip of Florida. It is almost 1,800 miles long, and while it has one of the densest human populations, it also has a vast amount of unoccupied space in it. Waterfowl from the northeast side of the continent, the Canadian prairies, Baffin Island, and the eastern Arctic use it. Although it holds more than a third of the wetlands of the country, only about 12 percent of this area is very good for waterfowl because of the things that have been done to it. It is used by about 15 percent of our migrating ducks and 20 percent of the geese. It gets black ducks from North Carolina to the tree limit in eastern Canada; mallards from local eastern ponds to the prairie potholes in Manitoba to Saskatchewan; green-winged and blue-winged teal, wood ducks, widgeons, gadwalls, pintails, shovelers, and scaup from as far away as Alaska; ringnecks, redheads and the lordly canvasback; goldeneyes, buffleheads, ruddies, harlequins, mergansers, eiders, scoters, and old squaws. Canada geese are well distributed along the flyway, their greatest concentration being from Delaware to North Carolina, and there are greater snow geese and coots."

"The Middle Atlantic States have the greatest diversity of waterfowl, for many come to it from the prairie states without passing through the northern end of the flyway. They cut across below the Great Lakes."

In the Mississippi Flyway "a great number of very productive marshes and potholes that once produced ducks have been drained (this holds in our own flyway area, also) but waterfowl are resilient and have learned to take advantage of the new refuges, reservoirs, and the vast increase in grain farming and farm ponds. Geese, in particular, have responded wonderfully to the man-made changes, and are possibly on an all-time high."*

Again and again it must be emphasized, "How immense is the summer breeding range *and how restricted the winter range!* Yet in these wintering places the birds must find *protection, sufficient food, water, room. It should never be forgotten that we can have only as many waterfowl, gamebirds and other birds, as can be safely wintered over and spared to return north to breed again. And most of the winter sanctuaries, or wildlife refuges, are in the South.*"

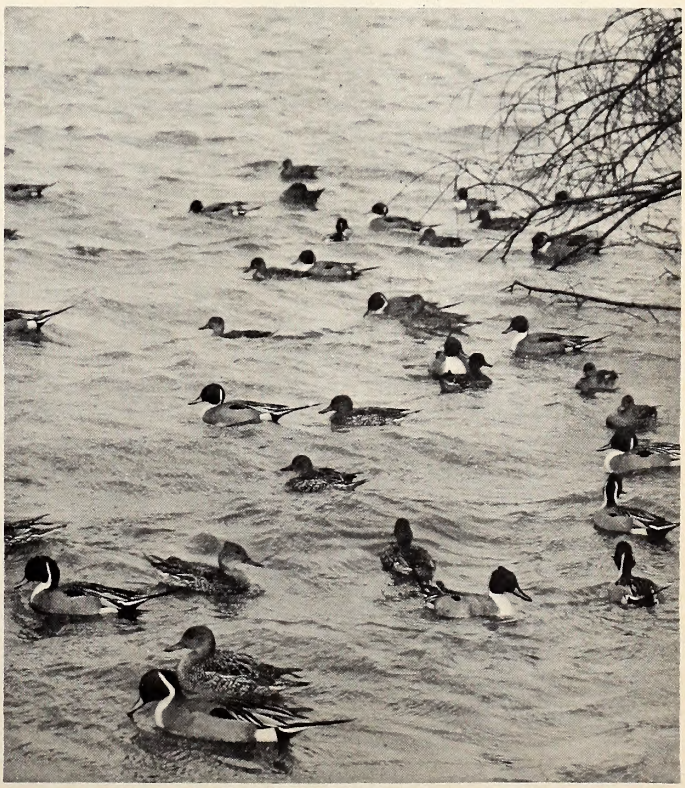
The migration routes, as they have been worked out, are mainly the fall ones of waterfowl. Although most birds return by the same route, however, on a lecture on migration, I recall Roger Tory Peterson saying: "In spring the big waves from



BOB HINES, U. S. FISH & WILDLIFE SERVICE

The Atlantic Flyway is but one of the major migration routes for North American waterfowl. Birds from as far away as Canada's prairie provinces funnel down our coast. Pintails, like these below, seek wintering refuges, which may be a key to rebuilding waterfowl populations nationally.

FRANK DUFRESNE, U. S. FISH & WILDLIFE SERVICE



the Tropics to Canada are up the Mississippi Valley and along the Appalachian ridges. (This includes the myriads of small birds). In the autumn, when cold winds blow from the Northwest, birds drift along the coast, so at times we get a concentration from vantage points such as Cape May, New Jersey; Cape Charles, Virginia, and Hatteras, North Carolina."

(A few birds, as the golden plover, have regularly established spring and fall routes.)

"Mallards make up about half of all the ducks killed on the Mississippi Flway; wood ducks and blue-winged teal come next. Although canvasbacks breed almost altogether in it, in northwestern Minnesota, most of them leave it for Chesapeake Bay in the winter." (WILD SANCTUARIES.)

Not all birds migrate north and south, or southeastward and northwestward. East-west migration is rather common in some species, for example the evening grosbeak. Year before last there were myriads of them in Virginia and the Carolinas; last year hardly a one was reported. Will they reappear this coming winter? They are sometimes classed as "erratics" or "irruptives."

Through banding we have learned that eagles nesting in Florida (Charles Broley, the famed "Eagle Man" banded over a thousand eaglets there) may wander northward in summer. A sort of reverse migration!

Another type of migration concerns the snowy owl of the Arctic tundras which, when food becomes scarce, often drifts southward. These flights occur when the rodent population of the Far North drops to a low ebb. The Carolinas, in fact, all the southern states, even Texas, have records of this ghost-like bird of the North. (With us it is classed as an "irregular winter visitor.")

What guides these winged travelers on the long journeys across unfamiliar country and sometimes over wide seas? How do they find their way? Their sense of sight, marvelous as it is, is generally discredited as a sole explanation, since so many more birds travel by night than by day. Furthermore, some do fly high enough so that sight would be of little use, anyhow.

Although a bird's sense of hearing is acute, and it is conceded that bird calls do help keep a flock together, still there are no calls ahead, to direct the leader. What is it that sends the old gander leading the flying wedge on, on, winging his way through the blue? Homing instinct seems to be part of the answer. What of the first flights of young birds of the year, from their place of birth, it may be in the Far North, to the winter home of the species in the deep South, or even in South America?

These young birds have never known their wintering grounds. Yet they go, and often alone, for in many species, the adults have preceded them. How do they know where to go, and how to find the way? How do they find their summer range in the spring, for again, often the older birds have preceded them? Always the partial answer seems to be the same—the *homing instinct* (something a bird is born with, *not learned*?) Coupled with a sixth sense, an instinctive sense of direction.

There are various theories—as "light compass," "magnetic," but as yet, theories only. And what else? It is the unknown—just a part of the mystery, and the wonder—we call migration.

The old conception that birds migrate at great heights is not borne out by recent studies, although it is granted that height is influenced by the weather. On cloudy nights birds usually fly lower to escape the moisture laden clouds. Alexander Wetmore believes that in clear weather birds seldom fly above 3,000 feet, with 5,000 feet as a probable maximum. Of course, there are exceptions. Mountain ranges force migrants into higher altitudes, and cranes have been recorded at 16,000 feet. A pilot f r i e n d who, during the war, had "flown the hump" on many missions, told me he had seen large birds at 20,000 feet.

In the past, speed has been exaggerated, although here again there are exceptions. Birds, say scientists, have two speeds: one being the normal, every day rate for general purposes, which is doubtless used for migration, and a swifter one for escape (as bobwhite's), or pursuit, the last being demonstrated by the peregrine falcon's (duck hawk) spectacular "stoop."

These fast speeds, however, are spurts, and cannot be maintained. Today it is generally accepted that a common flying speed for most ducks is between 40 and 50 miles an hour; much less for smaller birds.

Nor do birds migrate day after day, at regular speeds. While some, like the Arctic tern and the golden plover cover great distances without stopping to rest, most birds do not, as a rule, travel very far in a single flight. After each flight they may remain about a stopover, or resting place, for several hours, a day, or several days. Hence the importance of the "stepping-stone" refuges, especifor waterfowl and other game birds.

Heavy toll is taken of bird life at all times, but especially during migration, when innumerable thousands of small migrants, especially, are lost each year. Storms often overtake birds and hundreds of thousands—sometimes millions—perish. Instinctively, in heavy fog birds tend to fly lower, and being unable to see, often crash into tall buildings, shafts, power lines, lighthouses, lighted shafts. And hurricanes may take a terrific toll.

During migration, too, one may come upon the unexpected, resulting in some rare records. Migration then, sometimes brings an unusal, at times almost impossible-seeming, winged visitor. It all adds to the thrill of birds, in general. Yet in spite of the toll being heavy, the perils great, a vast majority of birds do come through safely. That they do, and often return to the same place year after year, seems almost a winged miracle.

Or just a part of the mystery and wonder—and at times—almost magic, of migration. ⬍⬍

Storm Over Bald Head

By Jim Dean

THE issue of what — if anything — will be done with the Smith Island complex (or Baldhead) in the Cape Fear River delta off Southport is still a long way from being settled.

Carolina Cape Fear Corporation of High Point, which purchased the island in July, 1970, from Frank Sherrill of Charlotte, has outlined extensive plans to develop the island. These plans have been in an almost constant state of change — even though options to buy lots on the island are being taken and some actual construction is slated to begin early next spring.

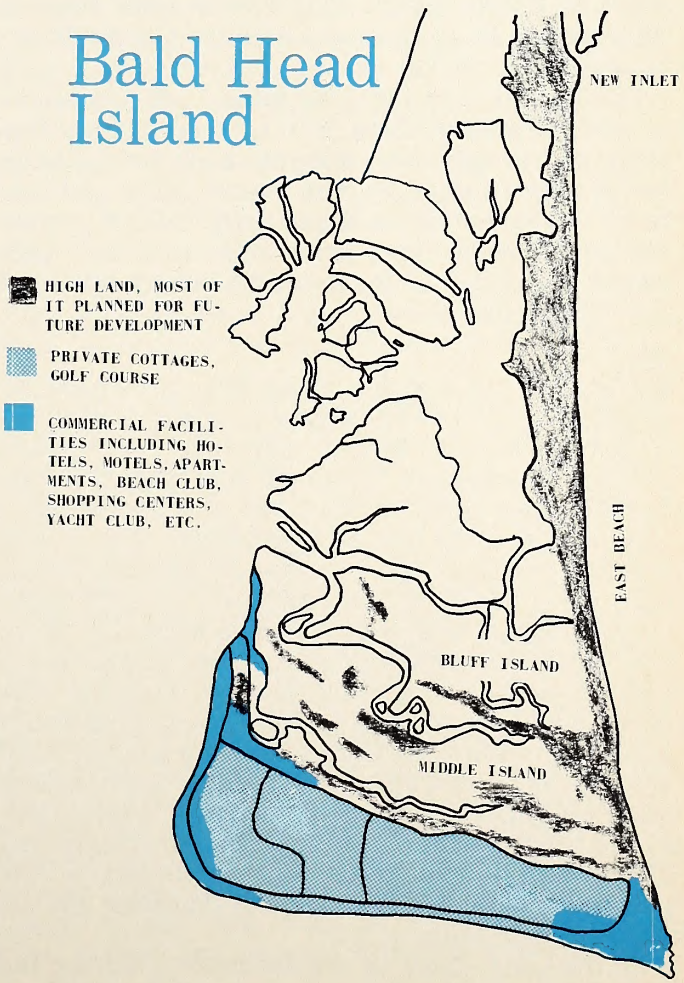
One reason for the apparent ephemeral quality of the developer's plans lies in the fact that such elaborate and expensive development cannot be charted overnight. It takes time.

Another factor which has played a major role in Carolina Cape Fear Corporation's plans is the widespread opposition to development on the island. Conservationists, ecologists, sportsmen and many state citizens have vigorously opposed development of the island, saying that it should be set aside as a natural area. Governor Robert Scott has openly stated his opposition to the island's development. These factors have also influenced Carolina Cape Fear's development plan.

Underlying all this has been the state's claim to the some 9,000 acres of marsh which surround the 2,800 acres of high ground on the island, and also the state's pledge to deny permits to dredge or build a bridge to the island.

The result has been confusion. The general public still does not know what sort of development is planned at Baldhead, and Carolina Cape Fear Corporation has done little to remove the confusion. In fact, contradictory quotes from Carolina Cape Fear Corporation President William R. Hen-

Editor's Note: To write this article, the author interviewed William R. Henderson, president of Carolina Cape Fear Corporation, consulted numerous reports and scientific studies about the island and marshes, talked to prominent scientists and ecologists and visited Baldhead.



This map illustrates Stage Two in Carolina Cape Fear Corporation's development plan for the Smith Island Complex. The Corporation hopes to complete this step within five to six years. Later, Middle Island, Bluff Island and east beach to New Inlet would be developed.

Many words have been written about this island complex, some with great emotion, some in anger, certainly many in frustration. The fact remains that once developed, Baldhead will be lost from Nature's domain, forever.

derson have further clouded the issue. At one point during Carolina Cape Fear's early involvement with the island, Henderson was quoted as saying that the island would have an ultimate population of 60,000 people. Later, these figures were reduced drastically (the figure of 60,000 people, according to Henderson, was an unfortunate holdover from the earlier Rader Plan).

Other quotes from Henderson have contributed to confusion on the part of the public. He has been quoted as saying that the development would offer "totally-controlled, wilderness-like living," and be a "low-density resort development." At the same time, plans were announced for a posh convention center, motels, condominium apartments, golf courses, tennis courts, an amusement park and a yacht basin in addition to private cottages. To many people, it didn't add up.

Even now, the average citizen doesn't know—in any detail—what is planned for the island, and although Carolina Cape Fear's plans have jelled to some degree in more recent months, the public remains largely in the dark.

During this past July, Henderson was interviewed about Carolina Cape Fear's plans for development. In the interview, Henderson revealed a number of new concepts in the overall plan, and laid to rest some erroneous rumors which have persisted. At the same time, many new questions were raised, and a few of them will be briefly discussed later in this article.

Basically, the Carolina Cape Fear plan calls for development in several stages — possibly as many as five. Full development may take 15-20 years. In July, Henderson indicated that the first and second stages might be combined, and that development would entail from approximately 900 to 1,600 acres of primarily high ground on Baldhead itself (the main island in the complex). If 1,600 acres are developed, this woud involve virtually all of the high ground on Baldhead. Later stages would take in Middle and Bluff Islands, and the east beach which extends up to New Inlet. This would involve an additional 1,200 acres for a total of 2,800 acres — or all the high ground in the Smith Island complex. An additional 1,400 acres — which Henderson says consists entirely of marsh fringes and open water — would be considered part of the project, but see only limited development and no actual construction.

In the early stages of development — during the next five to eight years — plans call for the construction of hotels, motels, apartment condominiums, a golf and country club, a tennis club, stables, shopping centers, a beach club, an amusement center and, of course, private cottages and homes.

Henderson indicated that the island will be a year 'round resort, and that it will be exclusive to the extent that the average North Carolinian would probably not be able to afford to spend his vacation there.

"Unless he puts more emphasis on his vacation than most people, he could not go to Baldhead," said Henderson, indicating that such a trip would be quite expensive. "It would have to be a pretty important trip for him."

Approximately five boat collection centers (marinas) are initially planned in Baldhead Creek. No individual slips at private homes will be allowed. Henderson indicated that he expects that the creeks will have to be dredged to allow boating access, but that no more than 40 to 100 acres would be dredged, and this would involve virtually no marsh.

In the latter stages of development, the total population of the island during peak periods is expected to be approximately 16,000 people with a permanent population of about 4,000 people, and an average daily attendance of about 4,300 people.

Carolina Cape Fear hopes to sell some 3,000 lots to private individuals. Prices for these lots will be high, far above the reach of any but the most affluent. These lots would be clustered around natural areas, and the total area for sale to private individuals would comprise about half of the 2,800 acres of high ground, the rest being either for development or other facilities or left in a natural state.

If the island is fully developed under this plan, natural areas near the clusters of private homes would be left untouched, but the wilderness aspects of the island — as they now exist — would be gone.

According to Henderson, no gasoline powered automobiles would be allowed on the island, and transportation would be by electric cars — resembling golf carts — on winding trails throughout the island.

Henderson said that the admitted heavy biting insect population on the island would be controlled without the use of pesticides, and that the freshwater ponds would not be drained or destroyed. Carolina Cape Fear plans to drain stagnant salt pools on the island which are flushed only by the highest tides.

"We plan to bring these to a grade so that regular

tides will keep them flushed and salt marsh mosquito breeding grounds can be controlled," said Henderson.

Access to the island would be by boats and Hovercraft (Hovercraft skim the water on cushions of air). Henderson was not able to say exactly how many Hovercraft would be used, but that he expected to have three boats and perhaps as many as five or six Hovercraft. The boats would have a combined capacity of about 50 people, while the Hovercraft (of the size Carolina Cape Fear is considering) would carry 40 people each.

Although at one time during the early planning, Henderson promised a bridge, any immediate plans for a bridge are now strongly denied. Likewise, Henderson says that Brunswick County taxpayers will bear only a small part of any costs to stabilize the erosion on the east beach or New Inlet.

Henderson also indicated that much study had gone into the protection of the forest and plants on the island, and that it would take about $4 million budgeted over the period of the project to insure good forest and plant management, a cost Carolina Cape Fear would assume. Henderson did not indicate how this money would be spent.

All power lines would be underground, garbage would be disposed of in a sanitary landfill on the island, and sewage disposal would be through a tertiary sewage treatment plant, also on the island. Service personnel — except for management personnel — would live on the mainland and commute.

Dunes and grassy dune cover would be protected, according to Henderson, and this would tie in with plans to establish a beach patrol during the egg-laying period for loggerhead turtles. Also, Henderson said that the Corporation is considering setting up a special nursery for raising and releasing young loggerheads.

These plans, Henderson said, have been made under the direction of an eight-man Ecology Advisory Board which "is made up of some of the top men in the nation in this field." Henderson declined to reveal the names of the men on this board, but indicated that most were from North Carolina. He also declined to say if Dr. Frank McCormick of the University of North Carolina is one of his advisors. McCormick is the only ecologist to openly support development of the island, while many have openly opposed it. Henderson said that his ecological advisors are not salaried by Carolina Cape Fear, but are paid expenses by the Corporation.

On the surface, much of what Carolina Cape Fear has planned seems to have been designed to partly mitigate or lessen environmental damages which are usually associated with such development, and if many of these plans are followed to the letter, they will indeed be an improvement over past plans to develop the island complex, or any other coastal area in North Carolina for that matter.

Unfortunately, Carolina Cape Fear Corporation's development plans leave many questions unanswered — beyond the most obvious one of whether any development at all should be allowed on the island — and there is no way to insure that even good plans can, or will, be followed in the coming years.

No matter how carefully considered and worded, the plan is still an extensive one which will completely change the unique character of the island. There is simply no way that all of these facilities and a permanent population of 4,000 people can fit into 2,800 acres without destroying the island's wilderness appearance and changing its ecological balance.

One of the specific problems which has not been satisfactorily resolved involves access to the island. If Carolina Cape Fear is sincere about using boats and Hovercraft as the sole means of access, this could create a potentially dangerous situation for the occupants and visitors. How can a small fleet quickly evacuate from 4,000 to 16,000 people from the island in the face of a major storm, particularly when rough water hampers the evacuation? It is conceivable that several times a year, Baldhead might be more like Dunkirk than a resort.

Colonel Paul Denison, former chief of the Wilmington office of the U. S. Army Corps of Engineers, has said that development of an area as low-lying as Baldhead "portends an extreme element of danger." He has been quoted as saying that less than one percent of the island's 12,000 acres is above 20 feet elevation. The old houses on the south beach — which Carolina Cape Fear uses to point out the feasibility of long-term settlement — were built in that spot by men who knew the island; men who knew that it was one of the few places relatively safe from high water. High water, not wind, is usually the most destructive element of a storm.

Carolina Cape Fear's expressed lack of interest in a bridge is puzzling because it is apparent that a bridge is very much a part of the long range plans. Henderson says that possibly by 1984, a resident population on Baldhead could form a Landowners Association and request a bridge. He believes such a move would be successful.

Whether taxpayers might eventually pay for such a bridge is not known at this point, although Henderson says that Carolina Cape Fear would build and pay for it. In order to do this, however, access across Fort Fisher would be necessary and New Inlet would have to be stabilized, if in fact it still exists. In recorded history, there has always been at least one inlet along east beach, and sometimes as many as three. New Inlet—the present one—is moving south 300 feet per year.

Even if the state were to grant access across Fort Fisher, the cost of building a bridge and

• **BALD HEAD continued on page 24**

BOW BUCK

by Jerry Rushing
Monroe, N. C.

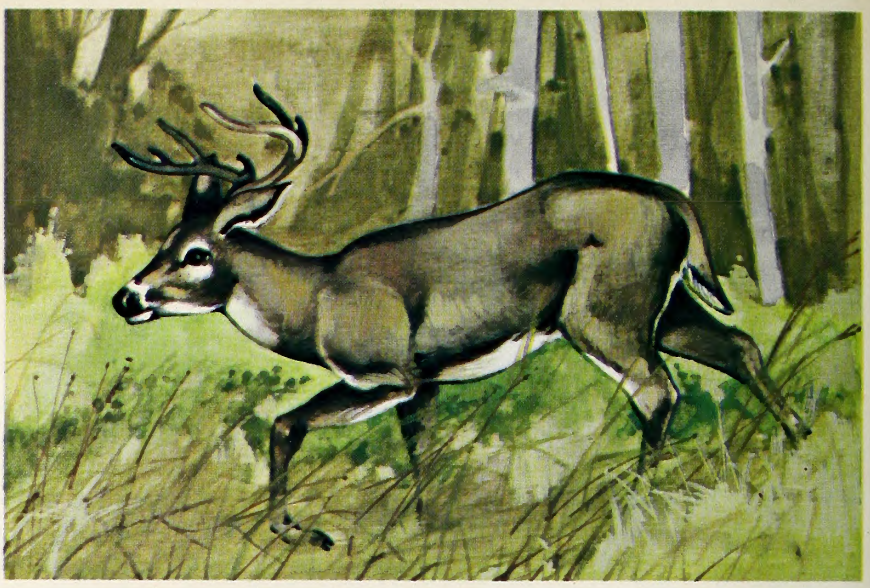


ILLUSTRATION BY TOM HALE

OPENING day of deer season was only one day away. I spent the entire morning assembling my gear and preparing for the trip that lay ahead. That afternoon I sharpened by Bear razor heads and double checked to see if I had left out anything. Around the Archery Lanes deer hunting was the only subject. The boys had forgotten about the big carp and gar they had chased up and down the river all summer. Bow fishing was a thing of the past now that the 21 day deer season was opening. Like the rest I could hardly wait as the afternoon and evening seemed to drag by.

Finally it was closing time and I dumped my gear in the back of the old truck, bid farewell to the wife, and set out to meet some of the boys from Sherwood Bow Club over in Uwharrie. Upon arrival I could see things were in full swing. Jim Hogan and Braxton Williams were still crying about the big bucks they had missed because a twig deflected their arrows. The twigs were cut and hang dry upon the wall with the inscription of "My Deer" written under them. Max Pfister went through the story about the big doe he hit 65 yards across the river only to lose it to some other hunter. Don Baucom was ribbing Jim Duncan about the doe he had missed six times in an open field and then had to get down out of his stand to scare her away. Yes, deer hunting was in full swing with the tall tales and everyone was anxious to try their luck on the white tail tomorrow.

Time passed rapidly and soon someone suggested we get some sleep if we were going to hunt tomorrow. It was one o'clock and five would come rather early. If you have ever slept in an old house with a bunch of hunting buddies, especially if they snore, then you know it isn't easy to fall asleep. The laughter subsided and soon the sounds of slumber filled the air. Some of the guys talked in their sleep, some mumbled and the rest of the excited bunch rolled and tumbled until the alarm knifed its way into the turmoil. Covers flew in all directions as the hungry army made their way into the kitchen. After washing in the ice-chilled water the old coffee pot was put on the stove and ham and eggs started sizzling in the old frying pan. Soon the aroma of breakfast filled the fresh morning air.

After we had eaten everything except the table cloth, we gathered around to decide how we were going to hunt this morning. I had done quite a bit of scouting this summer and was certain we could get some shots at Mr. White Tail. I do my scouting two months before the season opens and make as few signs as possible. After I find a good spot frequented by deer I don't go near it again until the morning of the hunt. I never hunt open fields but instead pick a spot 300 or 400 yards back on a ridge where the deer bed down for the day after a morning of browsing and feeding. I find the main trail leading to the ridge from the fields and pick a good tree 30 yards off this trail and build my tree stand. I find I have better luck hunting this way. My experience in hunting the open fields is that they are more rewarding in the afternoon. It may be just my way of thinking but I have bagged a total of 32 deer in the last twelve years of hunting over four states, so somewhere along the line I must have used the right method.

We separated our bows and arrows and set out through the darkness to our tree stands. We moved in single file dropping each man at the stand he had drawn earlier that morning. I reached my stand just as the new day began to break through the darkness. I climbed up the tree and settled down to wait for daylight to arrive. I removed two arrows from my bow quiver and placed them on a limb so they would be easy to get to in case I missed my first shot. The crisp morning air and the smell

of oak seemed to burn my nostrils. This was an ideal morning for hunting and all I had to do was wait for unsuspecting Mr. white tail to come by. I sat motionless until about 8:30 and still no signs of a deer. I heard a rustle of leaves and a quick glance told me the grey squirrels were out in full force, gathering nuts and acorns and keeping the bow hunter alert. I watched him search the leaves and rotten logs for buried treasure, then jump from tree to tree and finally disappear down the hill toward the river. These animals are beautiful, graceful creatures to watch but a pest when you are trying to get a shot at that trophy buck.

Everything was silent for a few minutes then two pesky chipmunks took over. Fighting and quarreling they chased each other around the rocks at the base of my tree. Like Mr. Bushy Tail their final disappearance was appreciated. Ah! Peace and quiet except for a distant woodpecker hammering on a dead tree. Fifteen minutes passed and again a rustling of leaves and lazily I turned expecting to see another squirrel but this time I saw a small brown spot emerging from the dense underbrush on the hillside. It was a small doe weighing about 30 pounds. Behind her was a second deer. They were browsing up the hill heading straight for my stand. They crossed the open lane not knowing I was only 30 yards away. The second deer was also a doe but she was larger than the first and I figured she would weigh about 90 or a 100 pounds. Carefully I controlled myself and searched the brush behind them. My stillness was rewarded by a buck tagging along about 20 yards behind the two does. He had sent them ahead as decoys and had remained behind to see if he could detect any suspicious movement as the deer passed along the trail. Now his curiosity was satisfied and he was following them toward my stand.

He was a nice buck with a six-point rack that sparkled in the sunlight. Even though he was following the does he was far more cautious than they were. He walked up to the open lane and stopped directly behind a holly bush. Now my heart was pounding like an idle trail bike. I figured he would jump the lane so with trembling hands I pulled the arrow back in the bow. The buck took a short step then became airborne. I released the arrow and it landed with a thud in the ground under him. He made another 20 foot jump then stopped. I grabbed for another arrow. I was going to get a second chance at the prize. The buck was suspicious but he hadn't figured out what had happened yet. I had ten thumbs and no fingers as I tried to nock the arrow and watch the deer at the same time. This was too much. The arrow slipped out of my hand, bounced off the tree stand and slid to the ground below. There was no doubt in the buck's mind now because he disappeared before the arrow made it to the ground. You who have experienced a miss on the first shot and a chance at a second one know exactly how I felt.

I waited disappointedly until 11:00 o'clock then climbed down out of my tree stand and made my way back to the cabin to join the rest of the boys for lunch. Now my appetite was gone, but upon arrival I saw a few more of the boys with long faces—I wasn't the only one that had missed a deer. I had plenty of company. We had a saw mill lunch, consisting of pork'n beans, Viennas, and crackers, then planned the afternoon hunt.

We decided to hunt the river bottoms that afternoon so I told Jim Duncan to take the boys in the back way. Braxton and I would walk the hillside and if we jumped any deer one of them might get a shot. We gave them plenty of time to find a suitable spot then started the half mile walk to the river. Braxton was 75 yards up the hill from me as we entered a huge thicket. I heard something coming that

The author displays the proof of a successful bow hunt. Luck plays a part in this type of hunting, but skill pays off consistently.

sounded like a herd of cattle. I saw about a dozen deer heading straight for Braxton and I didn't want to yell at him because that would probably turn them in a different direction. Some 50 yards behind the first group were two more deer. These were bucks with nice racks and they were really stretched out. I pulled my bow back and led the front buck and released. To my surprise the arrow struck home in the second one! A beautiful shot as the arrow collided with the deer. He slid to a stop, whirled on his back feet and set out in another direction. I heard Braxton yell and figured he had made a hit on the lead buck. When I reached him I heard him mumbling to himself. I asked him what had happened and he replied "Deer had run all over him and he had his bow hung on a limb and in some honeysuckles and didn't get a shot at a single one of them."

I told Braxton I had hit one and we went back to see if we could find a blood trail. I was so excited I could hardly talk but managed to tell Braxton how I had hit a running deer with bow and arrow. We decided to give the deer about an hour and a half before we started to trail him. The deer was excited so we wanted to give him plenty of time to calm down before we started out. This hour and a half wait was the longest week I had

• **continued on page 27**

The Thoughts of a Summer Naturalist

by David M. DuMond
Raleigh

PHOTOS BY THE AUTHOR

AS I pointed to the patch on my gray uniform shirt, I queried the young faces before me, "What do you suppose a naturalist is?" The question was met with silence and blank faces. I pushed backward and posed, "Well, what is nature?"

This was a question I had haggled out in my own mind myriads of times—always with the same answer. I could not expect, realistically, to have the same answer from this group of third and fourth graders, so after considerable baiting of the young minds, I was prepared to have them give me the same answer I had arrived at so many times before.

I could tell I had started some thought processes. Of this I was glad. The partial answers began coming singly and almost inaudibly at first. "Birds." "Bugs." "Trees."

I nodded and continued to say, "That's part of it."

Hopeful suggestions began pouring forth. "Animals — rocks — dirt — SNAKES — flowers — deers — lizards."

I held my hands for quiet, and said, "These are all parts of it." Then I began a series of questions designed to carry their minds from certainty of what they already thought, through confusion about what they thought, to a clarity of what they should think.

"Is a car part of nature?" I began.

An emphatic and of-course-not "NO!"

"Is a highway part of nature?"

Same answer.

"Is a tree beside a highway part of nature?"

Mostly yes's this time, but with something of an air of mistrust.

"Is the act of a car driving off the highway and hitting the tree a part of nature?"

This time, a chaos of yes's and no's—mass confusion.

I began again, hoping they would begin to relate. "Is a car part of nature?"

A few yes's, mostly no's.

"What is a car made of?"

"Metal and things."

"Where does the metal come from?"

"The ground."

"Is the ground part of nature?"

"YES," was the answer that this time contained a hint of disgust.

"What is nature?"

This time the question was answered by a disgusted young fellow in the back who was eager to get the "snake hunt" under way. With a very fatigued manner he said while looking at the ground, "Everything."

This was what I wanted, and for two or three more minutes I explained why he was right, and what I was supposed to do as a summer naturalist.

Each summer the Division of State Parks in North Carolina hires summer or seasonal naturalists to lead and carry out an interpretive program for the benefit of the people using the parks during the summer months. Slide talks and nature hikes constitute the bulk of the summer work for the naturalist. This was the way I spent the past summer. It was eye opening, shocking, encouraging, revolting, hopeful, scary, amusing, and never completely fulfilling.

Nature, I suppose, is what you make it. To some it means one thing; to others it means something else. Many people look at nature as something "out in the woods," but they forget, or never knew, that nature isn't just plants and animals that a naturalist can put names to. Nature is also actions, processes and countless numbers of cause-and-effect interrelationships. These interrelationships do not stop at the edge of the woods, or at the boundary of a park, or at the edge of a highway, or at the outskirts of a shopping center. It might be said, that anything which has an effect on nature is part of it. This certainly includes human beings.

This was the philosophy I carried into the park with me at the beginning of the summer, and the one I used to direct my interpretive programs. I found it very difficult, indeed, to relegate myself to the simple telling of funny stories and naming of plants seen along the trail. I felt and still feel the time has come for nature to be recognized as something other than a form of recreation—a plaything, political or otherwise.

Most of the nature hikes with the youngsters began much like this article. The rest of the hike usually consisted of explanations of some of the cause-and-effect relationships within nature and between its parts. Almost always, the role of the park as a natural preserve was brought into the picture. Examples were drawn from the wild plants and animals we encountered along the trail and fed into an explanation of some current man-related situation. A hawk is not just some big bird that flies around looking for small animals to eat. It is a living, breathing, feeling part of nature that acts in certain ways characteristic if its kind. It occupies space and needs a territory of at least a certain size in which to live and obtain food. If there are fewer hawks in the park, it probably has something to do with the fact that much of its suitable habitat is being eliminated by some other species, busily gnawing away near the boundaries of the park.

A lot of "what-if's" were tossed in the pot. What if all the turtle eggs laid by mother turtles were to hatch and manage to grow up to adult turtles? The world would soon be knee-deep in turtles. This

example often helped to change the opinion about raccoons that dug and ate turtle eggs from one of disgust to one of respect. This was a good time to talk about the natural controls on the numbers of other living things in the world, and what happens when they are removed.

The hikes ended with a reminder that seeing the nature trail once did not mean there was no more to be seen. Next year, next week, or even tomorrow it would be different. More and more things could be discovered each and every time the trail was taken.

"Is the park for sale?" said a small questioning voice.

"No," I replied, "Do you want to buy it?"

"Yes, and keep it so nobody can hurt it."

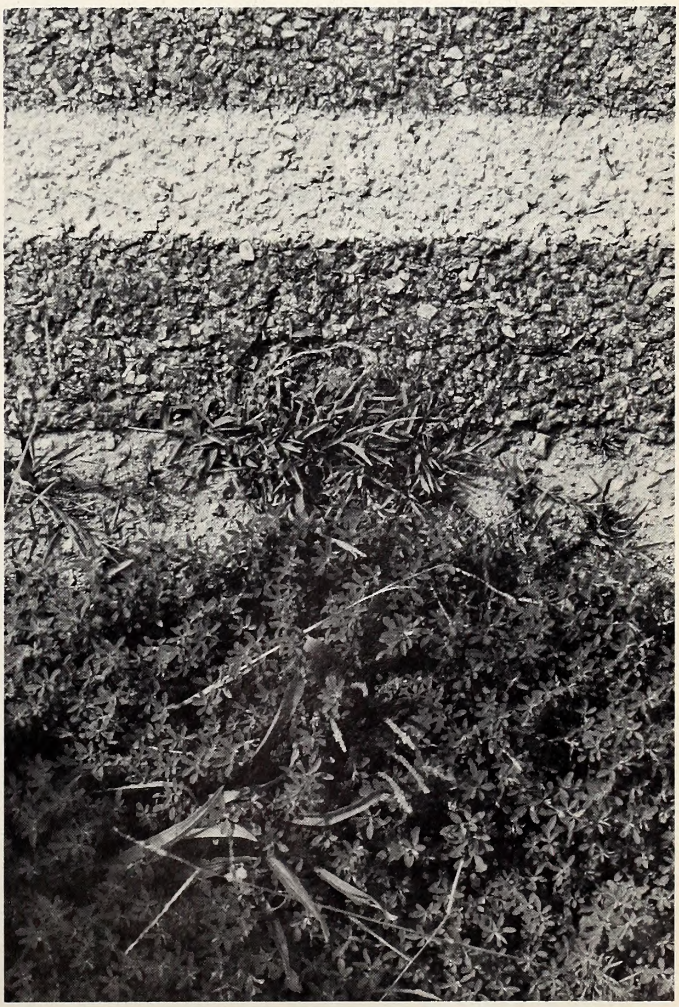
Simply getting people to go on nature hikes was often something of a challenge. I sometimes felt like a preacher trying to increase the size of his congregation, what with the excuses I got. "It's too hot." "We're too full." "Oh, I've been on that trail once before—last year." "We've already seen all that." "Our program doesn't allow us any time for that type of athletic activity." "You ain't gettin' me in no snakey woods hot's it is!" "I get poison ivy if I look at it." And so on, and on . . . .

The people I actually had on hikes and talks were of backgrounds much the same as you would expect to find in a busy shopping center on Friday afternoon. The total numbers of persons participating was somewhere in the vicinity of three to four thousand. These, I think, are sufficent backgrounds and numbers to allow me to draw some conclusions and make some comments on the general state of attitudes, interest, and knowledge of the value of nature to the park, to man, and to the world as a whole.

There was a decided lack of knowledge about the natural world beyond a very narrow human sphere. This was often accompanied by a lack of concern that was a kind of indifference built of boredom. The application of examples from wild nature to make points about human ecological misfortunes was something so new that asking people to grasp them was like asking them to grasp a snake. I felt myself being labeled a heathen upon occasion when I spoke of the human animal in a portion of nature that was governed by most of the same rules as the rest of the natural world. It often seemed inconceivable to some that natural history and animal and plant ecology had anything whatsoever to do with humanity. I learned that all

Man continues to confront Nature with barriers, and then wonders why he is in the ecological mess that he is in. Nature doesn't stop at fences . . .

. . . or highways. Nature will bend but so far, then snaps under unbearable weight of generations of misuse. As this happens, everybody loses.



nature is measured by a yardstick called man.

Snakes, poison ivy, and bugs were "bad." They would "hurt you." Desire for understanding of even those bits of life that are not known to be harmful to man or his possessions was commonly stifled by fear of all those unknown things that "might hurt you when you took a walk in the woods." In a few cases the nearest thing to a natural experience was the urge to kill or tear apart whatever was found on the trail. Understanding and appreciation could never be accepted, but in their stead, "Thump it on the head and see what it does." (This particular comment came from a group of teens and young adults.)

For nature to be appealing, many had to understand it in terms of what good it was for people. The three most common questions along this line were, Can you eat it, Is it poison, Does it bite. These questions were frequently asked in a way that made me think the person asking the question had no other way of placing a value on the wild nature he was viewing. I tried to answer the original question, and at the same time give him another way of looking at what he saw.

Nature does not function for people alone. When we take certain portions of the natural world for food, shelter, etc., this does not mean that these portions have no other function; nor does it mean that the unused portions have no function at all. If pine cones grow on pines, it is for some reason other than their value as Christmas decorations. Earth worms and crickets are good for something besides fishing.

"I may not be educated too good, but I know that poison snakes aren't good for nothing in nature."

As a result of the type of culture we are living in, people seem generally to feel that man is the only form of life qualified or capable of making decisions that govern the course of nature. This results in use of the natural world as only *he* sees fit. Nature becomes a storehouse, a factory, or a laboratory; rarely a temple. Nature is conquered, dissected, or managed; rarely loved for what it is.

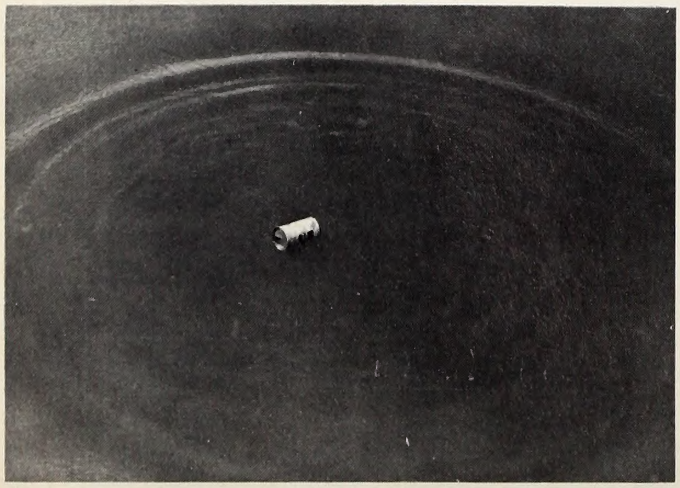
Upon several occasions I felt myself needling people into explaining what "good" and "bad" meant. "Termites are bad," was one of the more common generalities. In countering this, I explained that the decay of wood in the forest, and hence formation of rich soil was very dependent upon insects like termites. To try to eliminate all termites would slow natural processes of wood decay very drastically. The chain of events would not stop there, and somewhere along the line, you could bet your boots that man would be adversely affected by his own attempts at annihilation of this insect that seemed to be just a useless pest.

Saying that good and bad in nature depend only on the viewpoint of one kind of life is something of a slap in the face of humanity. It is like saying that man's decisions on how to govern nature are not worth much except to himself (though even this is often doubtful). Man is the only one who reads the book of "bads" and "goods" to nature, because he is the one who wrote it. We have not yet devised a way of directly asking other living things how they feel about some of the goods and bads. If we could do so, there would certainly be some conflicts of interest.

There is a way to gain some idea of how the rest of nature feels about our governing ability. Nature study. Not books, nor extensive notes, nor weighty camera equipment. Most of us already have the necessary tools—our senses. It is not necessary to know the name of something to watch it, listen to it, smell it, taste it, feel it. Place yourself in a bit of wild nature and move with it, not against it. Don't be discouraged, it's like anything new. It takes practice. In time, you will learn that man is, indeed, a part of nature; something so far greater than himself he may never comprehend it all. Man *is* a part of nature; something upon which he will always depend.

The ages of people as well as their backgrounds had much to do with willingness to accept nature on its own terms. Children from the first through

Can Man and Nature live peaceably together? Man is a part of Nature, and therefore must live in harmony . . . or else. Why do we do what we do?



The whole gigantic scheme of things is a never-ending story, with death and decay not the final chapter, but with renewed life springing forth.

the fourth or fifth grades were usually the eager ones. This was the group that did not yet carry the weight of adult responsibilities. They were not yet heavily affected by the stimulus of reaping an income for themselves and their dependents. I could tell them that nature is everything and that every thing is nature and they would accept it as readily as if they had just been given a piece of chocolate cake. It was no problem to fit man into the total scheme. They could see the problems we have, and even think of some possible remedies.

At what age do people finally decide to trade in old nature for a newer model—technology? How, in the future, can such a trade be avoided?

At that particular moment, I was disgusted. I was asking, "What good is the park? What's it worth? What's it worth to you?"

The first answers were in terms of dollars and cents—a thousand, a hundred thousand, several million—then a small, and until now, quiet girl spoke from almost under my chin, "It's w o r t h love."

Though we constantly hear them, clear-cut unequivocal answers to questions we ask are not necessarily correct. This at times became a great problem for me during hikes and talks. In biology, questions which seem to beg for categorical yes or no answers are often best answered by starting with, "It depends . . . ." It usually does. Very rarely can the words "always" and "never" be depended upon. These are words used to describe an unreal nature. This point I would make quite clear when necessary. I frequently used a particular river birch to make the point. Even the name of this tree implies that it always grows near rivers or streams. The tree I used was on a dry, pine ridge.

Nature and its laws discovered by people, written by people, and repeated by people represent an interpretation of something that has been observed as "normal." These laws do not represent total comprehension of nature. I found that for middle-aged or elderly persons, categorical answers are almost necessary for any degree of understanding. The young can base more understanding of nature on the conditional, it-depends kind of answers. At what age do you suppose this communication begins to break down?

There are probably very few single effects of any one thing that happens in nature. Anything which occurs serves as a trigger for a continuing sequence of events. The falling of a tree is just the beginning of a whole chain of events that seem infinite. Each event starts another sequence, and so on, and on, and on . . . . An appreciation for relationships and natural sequences of events is something I tried to interpret during nature hikes and talks. A tree, falling. The packing of soil along the trail. Decay of leaves. The aging of a pine forest. The building of a dam. A complete knowledge of all the different forms that such sequences effect is not necessary. It is the ability to think in related chains of thought that is truly valuable.

"That ecological stuff doesn't interest me. I just want to go on a nature hike."

For those who really seemed to enjoy the park and the out-of-doors, it came as a shock to learn that wild nature is not increasing in size, or area, or diversity to accommodate the spread of people and technological "improvements." Wild nature as we know it now is losing ground at a speed that is very closely related to the increase in such things as GNP, human comfort, human strife, modern conveniences, etc. Little of the money made from the disfigurement of wild nature is returned or contributed to helping it heal its wounds. When a highway or a shopping center replaces a forest, that forest is gone. Most of the living things which depended on it are gone—killed—perhaps buried in a grave as unsacred as a landfill. For those animals which are swift enough to escape, there is the problem of to what to escape. When suitable areas become limited, overcrowding results, which brings on hunger, disease, and death.

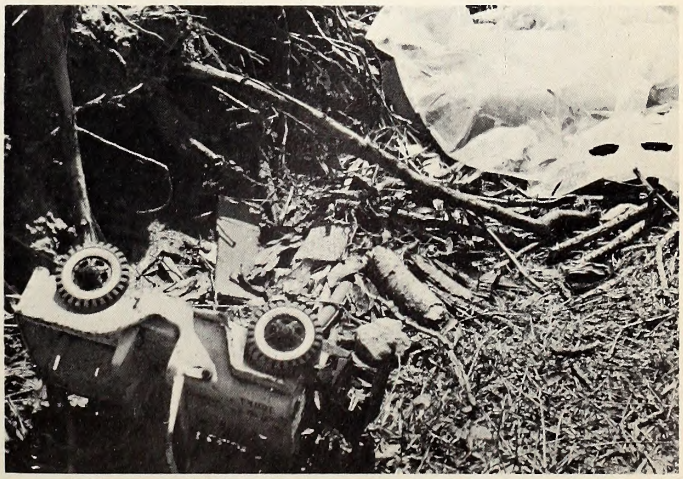
"Parks this size are sure a waste of good land."

There is a need, a very great one for the sake of the total earth, as well as for the sake of the future health of mankind. There is a very great need for people who can identify with both of what now seems to be two separating worlds—the world of man and the world of nature. Who can work to bring the two together again?

The young are receptive before they somehow diverge from an initial natural curiosity. The young do not have to be tricked into believing that all of nature is fascinating, worthwhile, and necessary. They somehow know it, but somehow lose most of their respect for it in the process of becoming adult, the time when realization is needed most.

The answer lies somewhere in the realm of respect and love for nature in the m i n d s of the young; respect and love strong enough to be carried and built through adulthood; not tossed by the way like some forgotten toy. ⬍⬍

Our basic attitudes about Nature and all its elements must change from one of "more and more" to one of true stewardship and respect for what we have been given. We cannot toss it away like some forgotten toy.



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Joyce Kilmer Memorial Forest	Mary P. Stephenson	September	4
Looking For Spring	Reader, Lieth & Radford	September	17
Managing Ft. Bragg's Forests	Jim Natherson	November	8
TURKEY			
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National Wildlife Week	David Coxe	March	16

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Motorboat Owners Take Heed

Registration renewal forms are bing mailed out to Tarheel motorboat owners statewide. Boat owners are cautioned to read carefully the instructions on the back of the forms, fill in the required information accurately, and return the entire form with the proper remittance fee.

It's That Time Again

Once again the Wildlife Commission's nurseries have produced an excellent crop of wildlife planting materials, and it is time now to order them. Order forms are available from local county Soil Conservation Service offices, County Extension Agent's offices, field biologists, and wildlife protectors, or by writing directly to "Wildlife Plantings," Box 2919, Raleigh 27602. Available are shrub lespedeza seeds and perennial seed mixtures such as re-seeding soybeans and cowpeas.

December Still Biggest Hunting Month

Although wild turkeys have been dropped from the December hunting schedule, this is still the biggest month for hunting in North Carolina. Sometime or other during the month the season on all of North Carolina's variety of game will be open except for wild turkeys and marsh hens. This year the only turkey hunting allowed will be during a spring season that opens next April 22 and closes May 13. Hunters and conservationists agree that the spring season contributes strongly to turkey restoration efforts in that it is at a time of the year when gobblers only are available since most hens are on the nest.

New Calendar

A 1972 calendar featuring the scenic Eno River which winds through Orange and Durham Counties has been printed by the Eno Association. The calendar is illustrated with seasonal scenes of the river and anecdotes of residents who have been long associated with it. The price per calendar is $1.50 and can be obtained by writing Mrs. Nancy Bless, 2711 Augusta Drive, Durham, N. C. 27707.

An Astonishing Feast

by Josephine M. Upchurch

TO destroy the true flavor of wild duck is some sort of "crime." Too frequently the duck is killed in the field by the hunter and somewhere en route from field to table the duck is murdered by the cook. Sometimes this occurs by deliberation: "a good way to kill the wild taste"; and sometimes it occurs through ignorance.

We assume that any hunter who is adept enough to kill a duck is also knowledgeable about plucking, cleaning and preparing the bird for temporary storage or for immediate table consumption. Contrary to general opinion, there is nothing mysterious about wild meat. It is simply meat and is subject to the same rules that govern the handling of domestic beef, veal, chicken or turkey.

For temporary storage, the duck should be wrapped loosely, so that the package is not airtight, in aluminum foil, (each duck wrapped separately), and placed in the coldest part of the refrigerator. The meat should be used within a few days. When ducks are frozen in a freezer, they should be wrapped separately and tightly in foil, air excluded, so that the meat will not lose its moisture content. The package should be in contact with either the bottom or the sides of the freezer until frozen solid. Then they can be placed anywhere in the freezer. For long-term freezing, one should be mindful of legal possession limits.

Here we shall consider immediate table consumption. Game has no "wild taste," as is frequently asserted. Game has a different taste. It should be treated as other kinds of good, wholesome meat or fowl and not as a mysterious food. The simple way to prepare game is the best way, and the exotic touches should be applied by way of the trimmings: gravy or sauce. Preparation of the meat should serve only to bring out its fine taste.

On a holiday some years ago, my husband came in about noon from an early morning hunt in Eastern North Carolina. He was carrying a wild duck which weighed about two pounds. He cleaned the game and handed it to me to prepare for dinner. It occurred to me to treat this "bird" somewhat the way I would a turkey. This is the recipe I followed:

1 two-pound duck, cleaned
1 stalk of celery (including leaves), chopped
1 small onion, chopped
1 carrot, chopped

Put chopped ingredients into the body cavity of the duck. Place the duck on a piece of strong aluminum foil large enough to cover it. Brush the duck with a mixture of melted margarine, salt, pepper, and a dash of mixed herbs. After tying the bird's legs together, bring the foil up over the duck and seal all edges with a double, tight fold to make an airtight package. Place the package in a shallow baking pan and roast in a hot oven (425°) for one and three-fourths hours. When roasting time is over, remove duck from oven and place it on a hot platter. Remove all ingredients from body cavity. Pour the juices left in the foil into a small saucepan and let them cook until a golden brown. To the juices add two tablespoons of currant jelly and a can of consomme. This mixture is served as a gravy with the duck.

A game dinner can hardly be considered complete without wild rice. While the duck was roasting, I prepared a wild rice casserole, using the following recipe:

1 cup wild rice
1 four-ounce can of drained mushrooms
2 tablespoons margarine
2 tablespoons butter
2 tablespoons finely chopped celery
½ cup of slivered almonds
1 can of chicken broth
dash of salt and pepper

Cook rice in boiling salted water, until tender, fluffy and dry. Melt margarine in an iron skillet and saute celery and almonds. When rice is done, add celery, almonds, mushrooms, butter, salt and pepper. Put this mixture into an oiled casserole dish and pour chicken broth over the mixture. Cover and bake at 350 degrees for thirty minutes.

So, what does one serve for dessert with wild duck and wild rice? It occurred to me that there was a quart of persimmon pulp in the refrigerator, and persimmon pudding seemed to be an appropriate dessert for a "wild" dinner. My recipe for persimmon pudding is simple:

2 cups persimmon pulp
2 cups sugar
½ cup margarine
2 eggs beaten
1 teaspoon of soda
2 tablespoons hot water
2 cups of flour
1 quart of milk

Cream sugar and margarine; add eggs well beaten; add persimmon pulp, soda dissolved in hot water; then add flour and milk. Pour mixture into large, moderately shallow baking pan and bake for one hour at 350 degrees. For an extra touch, each serving may be topped with whipped cream.

At five o'clock, I called my husband to examine our holiday dinner. His response indicated that such a festive occasion should be celebrated in some way. A young man from Vermont lived in the downstairs apartment. He was alone for the holiday. We extended an invitation to the New Englander to join us for dinner. He graciously accepted and remarked that he had never eaten wild duck, wild rice, or persimmon pudding. A good bottle of some fine dry red wine has a natural affinity for wild duck. In this festive setting with candlelight, we philosophized about the qualities of wild game as a delicacy. Our guest summarized his thoughts in this statement: "It is my opinion that this dinner is an astonishing feast."

Nature's Special Meaning

by Pam DeVere
News Herald Staff Writer
Morganton

REMEMBER those nature hikes with your father or an older person when you were a child?

Sights, sounds . . . Running water, lizards under stones, a pocketful of pretty rocks, birds, a collection of leaves . . .

Nature—it can mean so much to a little boy or girl, and to a retarded child it means even more.

For the boys in South Hemlock cottage at Western Carolina Center, institution for mentally retarded children in Morganton, it means an experience they can recall and relive long after they have returned from their overnight adventure in the South Mountain Game Land.

What makes the experience so memorable for a "special" child?

Anticipation for the trip began with a special project three months before the outing . . .

Constructing bird houses in the early spring, a simple project which evolved into an even more meaningful idea for the children and their instructors.

Jim Brooks, recreation therapist at Western Carolina, explained that combining the bird house project with overnight camping trips to the South Mountain area did not come until later in the spring when the boys wanted to hang their bird houses.

And that's just what they got to do.

Transporting the tangible bird houses into the alien surroundings of nature brought the project closer to home. It became something they could relate to.

Arriving in camp they were met by James Goodson, resident manager of the South Mountain Game Land, who took the boys in groups of twelve on a hike through the forest.

At every point of interest they would pause while Goodson pointed out something —

A wild iris hidden by a rock, a crawfish, a blackberry bush full of fruit . . .

Then Goodson helped each boy hang his very own bird house on a tree limb.

Once during the hike, they paused to watch as a doe fed in a small clearing.

What were the reactions of these multiple handicapped, trainable, mentally retarded boys after their overnight adventure?

Their immediate reaction may have been as little as a smile, but a smile that radiated genuine happiness.

Later, back at the center . . . recall. Something most unusual for a retarded child.

Like a bath in the river. They may only remember that it was cold, but they remember.

Although the benefits of this simple experience were unplanned, still other follow-up plans are evolving.

A project of the future is for the boys to do a couple of hours of conservation work a week in the Game Land.

And a particularly heart-warming plan is for the fathers of these boys to participate in the camping experience.

For what could mean more to any child than to explore nature with a parent . . . Remember?

Reaping the benefits of a project begun early last spring, George Mason hangs a birdhouse he made himself back at the Center. Helping George relate the work of his hands to the surroundings of Nature are James Goodson, manager of the South Mountains Game Lands (left), and Wildlife Protector Fred Capps.

Discovery! The thrill of finding an unpolluted mountain spring is shared with Robin Young (left) by parent volunteer, Stacy L. Faggart of Concord (center) and Wildlife Protector Fred Capps.

How to Become a Wildlife Protector

by Bob Hazel

"Dear Sir:

"I like to hunt and fish. I would like to be a game warden so I can wear a badge and drive a state car and help protect fish and game."

THE above represents the sincere desire of many people who apply for a job with the Wildlife Resources Commission. But getting such a job is not all that simple—as this article will tell you.

Before you decide you really want to become a wildlife protector it might be well to learn what the principal duties of wildlife protectors are. They patrol the forests, fields, and waters of the state enforcing the game, fish, and boating laws. This patrol is done on foot, in automobiles, in boats, and sometimes in airplanes. They arrest violators of these laws and cite them to court. They attend meetings of adult and youth groups, explaining the Wildlife Resources Commission's wildlife conservation and boating safety programs. They are required to work five days a week, but are subject to call to duty any hour of the day or night, any day of the week.

Their work is rewarding, however, monetarily as well as in personal satisfaction derived from helping to make North Carolina a better place in which to live.

The first step in the selection process is the screening of employment applications received throughout the year. This screening consists of determining whether or not applicants meet the minimum acceptable standards for employment, which have been set by the Commission and the State Personnel Department. According to these standards, an applicant must be:

Age: Minimum 21

Height: 68" - 78"

Weight: 150-235. Weight-height ratio must be reasonable

Education: High school or equivalent

Residence: Must have been a resident of this state for at least one year immediately preceding date of application. Having been stationed at a military facility in this state for one year immediately preceding date of application satisfies this requirement.

Citizenship: Must be a citizen of the United States

Physical conditions: Must pass a physical examination at his own expense showing no physical handicap and no reasonable expectation of even slight predictable physical disability.

The applicant must be of good moral character, as evidenced by having no convictions for violations of the law other than a very few minor traffic violations. He must be willing to participate in the competitive tests at Chapel Hill for the Wildlife Protectors Pre-Service Training School. These tests include general aptitude (IQ), wildlife knowledge, psychological and physical strength and agility tests, and an oral interview. He must successfully complete the three-week training school prior to employment. He must be willing to be stationed anywhere in the state, and to do a limited amount of traveling in the course of his employment. Applicants are not Commission employees while attending the three-week training school, and receive no salary or wages for their attendance there. The Commission, however, pays for meals and lodging, and the cost of the school and school materials. Although a few of the applicants who complete the school will probably receive probationary appointments as Wildlife Protectors at the present salary of $6828 immediately upon completion of the school, not all will be employed immediately. Most will be placed on a waiting list for employment, and will be employed as vacancies occur in the organization.

The maximum salary for an employee of this classification is $8568 per year. Opportunities exist for advancement to Wildlife Patrolman ($7476-9384), to Wildlife Protection Assistant Supervisor ($8568-$10,800), to Wildlife Protection Supervisor ($9384-$11,880), to Assistant Chief ($11,304-$14,388), to Chief ($12,468-$15,852). These are subject to change by legislative or Personnel Department action.

All equipment including radio-equipped automobiles and motorboats, firearms, uniforms, binoculars, etc., is furnished, and all necessary travel and uniform maintenance expense is paid for by the Commission.

Pre-Service Training

The pre-service training school consists of three weeks of intensive training for the selected candidates, given by the Institute of Government in Chapel Hill. The training is furnished free of charge, and the candidates are housed and trained at the Institute's modern building on the UNC campus. The following subjects are taught: Report Writing, Law of Arrest, Law of Search and Seizure, Game and Fish Law, Boating Law, Organization of the Wildlife Resources Commission, Organization and Function of the Commission's Five Divisions, Fundamentals of Game and Fish Management, Law of Evidence, Public Speaking, Public Relations, Firearms and Self-Defense, First Aid, Court Procedure, and Federal Wildlife Laws and Regulations.

The Wildlife Protector is a professional; he is intensively trained, thoroughly equipped, and well prepared to handle any one of the multitude of responsibilities placed upon him. You may wish to consider this honored profession.

Training moves at a fast pace and strict standards of achievement are required through frequent examinations. Classes begin at 8:00 a.m. and end at 8:30 p.m., with the remainder of the evening devoted to study. The Institute's fine library is made available for these study periods. The staff of instructors is made up of professionals from the Institute of Government and the Wildlife Resources Commission. The training course is considered by many to be the most thorough of its kind offered anywhere in the United States.

Placement of Candidates

Upon graduation from the pre-service school, the candidates who have successfully completed the training program are placed on a standby list to await employment by the Commission. Four trainee positions are kept filled from this list of candidates. When a vacancy occurs among the staff of wildlife protectors, the normal procedure is to place the trainee who has worked the longest period of time into the permanent position which has been vacated. For instance, it is contrary to the Commission's policy to assign a man to a position in his immediate home area, for obvious reasons.

Trainees work under the close supervision of experienced Wildlife Protection personnel, and their work undergoes continuous careful evaluation. In addition, when a trainee moves into a permanent position, his first six months of work is considered a probationary period, during which he is carefully evaluated. If at the end of six months his work is satisfactory, he becomes a permanent employee. Even then his work undergoes continuous evaluation. This is accomplished through observation of his work by his supervisors, and by efficiency ratings which are determined for all wildlife protectors every six months.

In-Service Training

Regular, well-planned in-service training is considered to be an essential part of the wildlife law enforcement program. During the new protector's first year of employment, he returns to the Institute for four weeks of basic in-service training, at which he acquires those skills, knowledge and techniques unique to the enforcement field.

Subjects taught in the Basic Protector's Training School are: Law of Arrest, Collection and Preservation of Evidence, Game and Fish Law, Fingerprints and Plaster Casts, Law of Search and Seizure, Law of Evidence, Interrogations and Interviews, Courtroom Procedure, Firearms and Defensive Tactics, and Pursuit Driving. Wildlife protectors advance from Basic through Intermediate to Advanced training. Protectors' Intermediate Training Schools provide further instruction on these same subjects. Advanced schools for protectors do not cover as broad a field, but put more emphasis on particular subjects.

In-service training schools for supervisors and patrolmen differ from the protectors' schools in that in addition to the subjects listed, a great deal of additional instruction in personnel supervision and management is included. In all in-service training schools, high scholastic standards are maintained.

In addition to the in-service training at the Institute of Government, occasional one-day schools in the various districts are conducted by personnel of the Commission and the Institute, to deal with particular subjects in which instruction is timely.

Results

This program of selection, placement, and training is responsible in a large measure for the present high standard of efficiency attained by the Wildlife Protection Division. We believe that our present officers are better qualified to do their particular type of work than any similar group anywhere in the United States. This is evidenced by the fact that we have continued to increase the effectiveness of our law enforcement program without substantially increasing the number of personnel. License revenue has continued to climb during the years, and this is, in a large measure, a result of better law enforcement. It must be recognized that while a majority of sportsmen willingly purchase licenses and comply with the laws and regulations, there are a considerable number of people who hunt and fish who would not comply with these requirements were it not for a strict enforcement program.

The success of our program is further evidenced by the fact that many other states have come to us for information which they are using in building similar programs in their states. We are proud that we have to some extent been pioneers in this field, and we feel confident that we will continue to achieve higher standards of efficiency by continued improvement in our selection and training methods. The Institute of Government deserves the major share of the credit for the progress that has been made, and we are very fortunate to have such an organization to help us with our program. Without their help, such a program would have been next to impossible to accomplish. ⬍

JUMP DUCKS!

by Jerald F. Mayes
Fayetteville

ILLUSTRATION COURTESY VIRGINIA WILDLIFE

NOTHING smells better than waking up to the aroma of perking coffee. Johnny Schoenith showed up about a half-hour early, a good policy that he has when he comes to get me up for a hunt. My dad had gotten up to drink coffee with us before we left. Even though I dressed as fast as I could, it was daybreak before we were ready. The morning was mild, unusually so for December, yet as we loaded the boat on my truck I could still see my breath as it hung in the stillness of the morning. It was seven-thirty before we really got our trek started, and the morning pass shooting for our local ducks was over. This made little difference

to us, however. We were hunting ducks, but ours was to be a float hunt, where we could jump our own. There are a few tricks one quickly picks up when he takes to float hunting.

The best thing that ever happened for the float-hunter was the idea of the road map. Through Johnny, I came into a rich inheritance of Highway Commission maps. There are county maps, available at the county seat, that show the course of creeks and rivers, and where roads cross them. Our floats usually consist of f l o a t i n g between two bridges where they intersect a creek. If both members have transportation in which a boat can be hauled, one car is left at the lower bridge, while both hunters carry the boat upstream to the above bridge and put in.

A word of caution. Lock your doors and leave no valuables in sight. Also, there is a law on the books against parking within a certain distance, about 50 yards, of a bridge. I don't know how stringently this law is enforced, but don't take chances.

Another trick is how to position your boat. I use a 12 foot jon boat, and float it backwards. The large square end (where the motor would mount) is then considered the bow. This has several advantages. The man in front is further separated from the paddler, allowing for a comfortable, more balanced trip. It gives a better position for the man who paddles. Because his end of the boat is a bit narrower, he can maneuver the boat easier. He can paddle without having to stretch out over the sides of the boat to paddle. Also, silence is golden. If you hit the side of the boat, especially an aluminum boat, it sounds like a cow bell. This won't always make a duck fly, but it will alert him of your presence. Then as you round the bend, he'll quickly spot you and fly out of range. If you can keep quiet, you'll be surprised just how close you can get to a duck. It's almost embarrassing to have to shout to get a duck that's within ten feet of the boat to fly, especially if you then miss him!

Floating down a small creek can be especially rough. Snags and fallen logs in a swift current can be deceptive. With the bow forward, the front of the boat sits lower in the water. This makes the boat move slower. Remember, going down a creek fast will only make you miss ducks. It will leave you lying against the bank in a curve, or loudly bouncing off trees in the water. The faster you go, the more mistakes you will make. Also, with the more deeply submerged bow, the boat will float over hidden snags, or will bounce off. It's a mess, as anyone who has been in this situation will tell you, to sit in the boat and try to rock, slide, and muscle your boat off a drowned stump.

Now, about the fire-sticks. John and I both use guns that are choke-bored, and chambered for three-inch magnums. These are better suited for pass shooting: however, when that's all you have, you use it. A full or modified barrel in twenty gauge or above will do fine. If you float correctly, most of your shots will be within range. Number four's or sixes in a 2¾-inch magnum are recommended, if your gun is up to it. A good high velocity shell will roll a duck over, so don't take a chance. A lost finger, eye, or even a life simply isn't worth any extra range you feel you might need.

Though it may bring arguments from some (but I don't see why), I don't think shot under size number six should be used. We don't have enough ducks to allow even one to get away wounded. A duck isn't the easiest bird to kill, and small shot just can't be depended on to do the job. It may be advisable, however, to take a couple of low-base, small-shot shells, which come in handy if you have to finish off a duck. Shoot for the head, for the wings are like armor, and you'll waste less eating fare.

Another tip on long shots. Don't take 'em. If you jump a duck out of range, let him go. Usually, these ducks will simply fly a short distance downstream and you'll get another chance for a shot. You'll have to be extra quiet in this instance, for these ducks will have been alerted. Take this advice with a touch of salt, however. Most of my experience in hunting waterfowl has been with wood ducks.

These ducks seem to take naturally to the habitat of the swamp-stream. John and I have floated sections of Rockfish Creek where it is narrow and where it is wide. The upper, narrow section ran through a swamp where we jumped over 50 ducks. Most of these we simply jumped without taking a shot, for we had our limits of woodies in a couple of hours. The current wasn't too awfully swift, but debris in the form of fallen trees and underwater snags gave us a heck of a time. The boat had to be lifted over trees that had fallen and now spanned the creek. This was done 37 times, and we had to portage around sections of unpassable blockage several times. For this reason, you must keep your duffel as light as possible.

On the lower, broader section of the creek, just above where it runs into the Cape Fear River, we had an easy float. However, the banks were high and the creek had sections of fast rapids. We saw few ducks on this water, and my one chance at a duck that was flying up the creek, straight into my gun barrels, was muffed when my reloads misfired. It must have been a bad seating for the shot holder jacket. Johnny also missed a couple of shots. The fact is that the water was moving us along too fast for a sneak, even though I was back-paddling most of the time.

Nevertheless, we did get a bonus on this trip. John got two fox squirrels, a grey and a red, and I took a black fox squirrel. A couple of grey, or "cat" squirrels, as they are often called in our section of the state, were also mixed into our bag. We seldom shoot squirrels on a float trip for ducks, but when one can get a shot at a nice fox squirrel (remember

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• BALD HEAD continued from page 9

stabilizing the inlet or inlets would be astronomical — probably more than any private firm could afford.

If a bridge were built, it would undoubtedly open the island to automobile traffic despite the grand plans for electric cars. Where would 4,000 to 16,000 people park their cars? At Fort Fisher? On Baldhead in some gigantic lot? At Southport?

Carolina Cape Fear's plan for the control of biting insects — principally mosquitoes, deer flies, horseflies and gnats — also presents some problems. Henderson is partly correct in stating that the insect population can be controlled by flushing the stagnant breeding areas, but this is an oversimplification of the problem. By grading and ditching in the marsh edges, the main breeding areas for the salt marsh mosquito could be virtually eliminated, but this would not destroy all the resident mosquitoes, and it would have no effect on those mosquitoes which come from other marsh areas and the mainland. Prominent entomologists say that large populations of salt marsh mosquitoes often travel great distances.

Also, elimination of the breeding areas could involve as much as several hundred acres, and it would take several years for visitors to Baldhead to see any effect at all, if then. There is also evidence that freshwater mosquitoes breed in the fresh ponds — in spite of claims to the contrary — but how significant this is cannot be stated at this point. In the meantime, if the mosquito population is to be controlled, it would most probably have to be done with insecticides.

As for the other biting insects — which constitute a real problem — entomologists do not know how to control them without the use of insecticides, and even then, they admit this is not too effective.

One entomologist admitted that efficient insect control on the island without some effect on the environment was impossible. Carolina Cape Fear's plans to control insects without insecticides are admirable, but how long will a harrassed population tolerate a control program if it turns out not to be efficient?

Stabilizing the erosion of east beach—a necessity if the island is to be developed—is another potentially expensive problem and erosion is almost always speeded up by development. The U. S. Army Corps of Engineers has stated that it might cost $1 million a mile to stabilize east beach. Henderson says that Carolina Cape Fear would stabilize the beach, if needed, and assume full costs; a price which he expects to be considerably less than $1 million a mile. Left undeveloped, the island's east beach erosion problem demands no attention because it is a natural process which combines with the fact that the south beach is building.

Politics will probably play the deciding role in whether these costs are borne by Carolina Cape Fear Corporation or taxpayers, and no one at this stage could hope to predict with any accuracy who might eventually foot the bill, despite bold promises.

The ever-changing political picture is what Carolina Cape Fear may be banking on for such matters as a bridge, inlet or beach stabilization. It is almost certainly the key to their hopes to gain dredging permits for boat access or mosquito control.

At present, the state has flatly refused to issue any permits to Carolina Cape Fear for dredging and filling. If this refusal stands, the Corporation is virtually hog-tied, and full and profitable development will never be possible.

Carolina Cape Fear is apparently counting heavily on being able to either change the state's mind or wait until new officials are in office who will be more agreeable to Baldhead's development. In the meantime, the Corporation apparently plans to continue with whatever development is possible and legal — hoping to wear down the opposition. It is a tactic which could work, although time generally is against developers because the tide of public opinion is against environmental damage, and it is rising.

Two other factors which make the ultimate development of Baldhead seem less and less likely— despite the fact that some people have taken options on Baldhead lots — is the increasing interest shown in the island by the Federal Government, particularly the Department of Interior. Federal agencies could stop development, even if the state doesn't, and present indications are that this is a distinct possibility.

Finally, the North Carolina Conservation Foundation has been formed to raise money to buy Baldhead — as well as some other valuable properties threatened with environmental destruction. The Foundation has been organized, but has not yet launched a strong campaign (as of this writing).

If the money is raised, the fact that Carolina Cape Fear has said that it would not sell is a moot point. If they are denied the privilege of developing the island, they could not afford to own it. They would either try to sell it or take the matter to court, most probably the latter. The likelihood of a long or uncertain court session could be enough to persuade the Corporation to sell.

If this happens, the island would almost undoubtedly be preserved for all North Carolinians— rich or poor—to see and enjoy in its natural state, and our children and grandchildren would have the same opportunity. It is an opportunity they will not have if Baldhead becomes a resort.

Perhaps most important of all is the preservation of the island as a hatchery and nursery for a multitudinous variety of marine life—life that comes to maturity in the great Atlantic Ocean and sustains man both economically and physically wherever he is. Development would insidiously, but surely, eliminate vast biological benefits that Baldhead Island now provides. ⬍⬍

Dear Sir:

The fourth grade class which I am teaching at Arcadia School recently became involved in a discussion of the humane treatment of animals here in North Carolina and elsewhere.

Our class, as a whole, is concerned about animal welfare, both wild and domestic. Individual students who are particularly concerned are writing also.

We would like to ask how we can help the situation. Also, if possible, please send us any information available on wildlife and domestic animal conservation.

Sincerely yours,
Rebecca Lambeth, Lexington

• It is heart-warming to know that you and the youngsters in your fourth grade are concerned with humane treatment of animals here in North Carolina and elsewere.

Let's talk about domestic pets first—dogs, cats, hamsters, rabbits, ponies, and even goldfish or white mice and white rats. These are animals we can pet, love, care for, and cherish. We would never want to neglect them by not giving them plenty of food and water and a good place in which to live.

Whether we like it or not people are animals, too. We certainly are not vegetables or minerals! But have you ever noticed how people sometimes treat other people? We are not always kind to each other, are we?

There are domestic animals that are raised for the sole purpose of feeding human beings. Some of these are cattle, hogs, and sheep. You can make pets of calves, pigs, and lambs; but you should remember that eventually they will end their days in a slaughterhouse and be served as food on someone's table.

Is this cruel? Perhaps it is; but don't we like ham and bacon and roast beef and hamburger and lamb chops? We cannot have these unless animals have been killed. We like fried chicken and roast turkey. These are birds, but we must remember they still are animals. They are not vegetables or minerals. We cannot have fried chicken or roast turkey unless someone first killed the chicken or the turkey.

Let's think for a moment about wild animals — mammals, birds, fish—and take deer as a first example. These beautiful, graceful animals had been hunted by humans for thousands of years before Europeans colonized what is now the United States. When this country was first settled deer provided both food and clothing for the pioneers. They were hunted intensively by settlers and succeeding generations for more than 200 years, yet there are more deer in North Carolina today than there were in the days of the Lost Colony.

Why is this? Because people have learned how to manage the land on which deer live; because we have game laws that are designed to prevent any person from taking more than his share of deer or any other game.

But what would happen if all of a sudden we were to decide that killing deer is cruel, and that they should no longer be hunted and killed? Experience has shown, time after time, and in many parts of our state and country, that if our deer herds were not harvested just as beef cattle are sent to the market, they would eat up all of their natural woodlands food and starve to death. We can feed grain and forage to domestic animals in the fattening pen to raise them for our own meat on the table, but we cannot do this for wild deer.

Let's also remember this: a deer in the wild has a chance of being missed by the hunter's bullet or arrow. He can run and escape into the bushes. The grain-fattened steer in a slaughterhouse has no such chance.

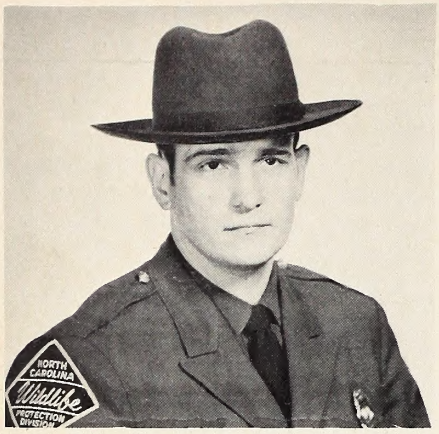
We all like birds, especially songbirds. Some of us have bird feeders near our home, and like to watch them come in to take the food we provide for them. Most of the birds we see around our homes are songbirds, entirely protected by both state and federal law. Others, such as doves and bobwhite quail, are protected by law but are game birds on which there are established hunting seasons and bag limits.

Shooting game birds may seem cruel; yet if hunters did not kill about 75 percent of them each hunting season nature would take that same amount through starvation, disease, and predators. Nature is sometimes cruel, too.

How can we help with animal welfare? Domestic animals and pets are completely within our control, and for this reason we can treat them humanely and provide them with food and shelter.

Wild animals, being wild, cannot be cared for in the same manner as those that have been domesticated. But we can help them by providing natural food and shelter. This is a major project of the Wildlife Resources Commission. We can also urge people to obey the laws and regulations regarding hunting and fishing. These rules are necessary to see that everyone gets a fair share of the game harvest, and that no one takes more than his share or that any species becomes in danger of extinction.

KNOW YOUR PROTECTOR



N. Tyson Laney

Tyson Laney was born in Blounte County, Tennessee, December 1, 1946. He is the son of Mr. and Mrs. Loren Laney of Marion, North Carolina. He became a member of Zion Hill Baptist Church of Marion in 1955 and is a graduate of Marion High School. He was co-guitarist of "The Milestones," a trio which entertained at the North Carolina Rhododendron Festival in Burnsville, and won the award, "Best Folk Group" at the Asheville City Auditorium in 1965.

Mr. Laney served four years in the United States Navy and was assigned as a Surface Sonar Technician aboard the USS Decatur, DDG 31, during ships deployment in the Gulf of Tonkin 1968-1969.

Tyson completed Pre-service School for Wildlife Protectors at the Institute of Government at Chapel Hill in June 1970. On June 22, 1970 he was appointed Wildlife Protector and assigned to Granville County. He has attended Pursuit Driving and Defensive Tactics School since employment as Wildlife Protector.

Protector Laney is a member of the Southeastern Association of Game and Fish Commissioners, Law Enforcement Section, the North Carolina State Employees Association, and is a NRA Hunter Safety Instructor. He is married to the former Miss Jane Basney of San Diego, California, and they have a son Chris, age 3. The Laneys attend Delrayno Baptist Church of Oxford.

In the case of many of our wild birds we can go much further. Many songbirds will use houses we build for them, and many more will come to eat out of bird feeders we provide for them.

Small boys sometimes like to shoot songbirds with BB guns and slingshots. Remember that these birds are our friends; they sing for us, and eat insects that would damage our gardens, our crops, and our trees. Also, they are fully protected by federal, state, and often, city law.

Hunting wild game may seem to be cruel; but it is no more cruel than starvation or disease, or being eaten by stray dogs and cats (remember, these are stray animals because people did not take care of them!).

None of the wild game on which there is an open season is in danger of extinction. Many species have increased in number because the hunters who take them during the open season spend money for hunting licenses, and this money goes to protect them and to provide a place in which to live.

Rod Amundson, Chief
Division of Education

Fish Stealing

A commercial fisherman was waist deep in the water working on his nets that had been damaged by Hurricane Ginger. He paused a minute to talk about people who steal flounder from nets.

He though such people were snakes and should be treated as such. A lot of commercial fishermen share his opinion. Their major gripe is directed toward "sport" fishermen who come down here from inland cities during October and November. They do acknowledge, however, that some locals will do it too.

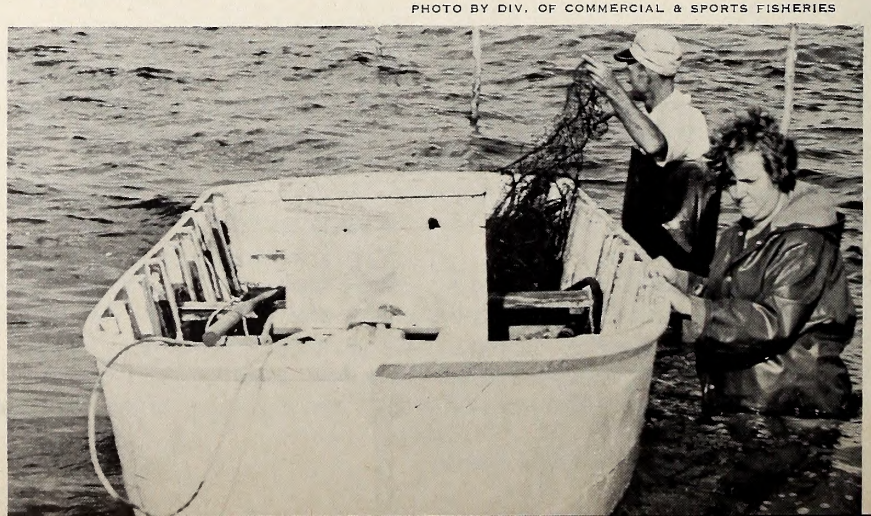
They say fish stealing is getting worse each year in Core Sound and some day someone caught stealing from a net is going to get much worse than a tongue lashing. The fisheries inspector in the area said commercial fishermen say they would gladly give a mess of fish to anyone who asked, but they do not want anyone stealing.

Probably some fish are taken as a lark. Others have stolen basketfulls. It's easy pickings. Fishermen set their pound nets close to shore. The net is set so fish are corralled in a small area. A thief can easily spear fish or empty the net by hand.

Not many people take time to realize the work that goes into setting nets (and stakes that hold the nets upright in water). One fisherman said it was too much trouble setting and keeping them up to mess with thieves. A string of flounder nets can stretch a thousand yards from shore. It takes many stakes to hold that much netting upright. The rigs cost money too: one fisherman can have several thousand dollars invested.

Hurricane Ginger visited commercial fisherman T. N. Harvey's Cedar Island flounder net. He had to spend several days repairing it before it was ready to catch fish again. His wife, Ina, helps him put the net up.

PHOTO BY DIV. OF COMMERCIAL & SPORTS FISHERIES



There is a law against it: "It is unlawful for any person without the authority of the owner to take any fish from nets, traps, other devices [used] to catch fish which have been placed in the open waters of the State." But lawmen, like net owners, cannot be around all the time.

Hurricane Ginger took a lot of pound nets, damaged most of them. Commercial fishermen have to tolerate hurricanes, but a fish thief is something else. ⬍

• **JUMP DUCKS continued from page 23**

—a limit of two a day), one simply doesn't pass it up.

So far none of our float trips has been a dud. We killed our limits several times, but this isn't always the rule. Before you go, put on lots of clothes, in layers, for the air is usually cooler on a creek or lake than in the living room watching television. The weather usually isn't too bitter during the early season, but when the North winds drive the big greenheads south, the wind can make you ache.

You may also want to carry a pair of sunglasses along. Most of the creeks flow in a general easterly direction, and as long as I have bothered to remember, that's where the sun first shows itself in the morning. The sun may not be too bad itself, but if the sun doesn't get you, the reflection will. The light reflecting off the water can quickly cause a splitting headache. Be sure of the waterfowling regulations; it's best to be knowledgeable in the facts.

It'll probably take a while to get the knack of boat control in a creek, but don't get discouraged. The hours are good, for you don't really have to be on the water at daybreak. We have been called lazy sportsmen because of that, but after you have paddled a boat steadily for several hours in a winding creek, you won't think lazy. But you will think it's one great sport, if you're sport enough for it. Check a map to find your pick up and drop off points, and then enjoy yourself, enjoy yourself to the hilt. ⬍

• **BOW BUCK continued from page 11**

ever spent.

The blood trail was weak and we had to almost crawl to stay on it. When we reached the river crossing we lost the trail so we split up and searched the river bank for any signs of a weakened deer. No luck. We searched until darkness drove us off the river bank. I had just thought how sick I was when I had missed the buck earlier that morning, but now I really had a bad case of the blues.

We decided to come back the next morning and continue the search. We knew the meat would probably be spoiled but the cape and antlers could still be saved This night was another restless one as all I could think about and see was that beautiful buck.

The next morning I was up at daylight and on my way back to Uwharrie. I stopped at the grill for a quick breakfast before journeying on to try to find my deer. When the waiter brought my breakfast he asked if I was going hunting. I told him I was going back to look for a buck I had hit the day before. He asked where I was hunting and I told him about shooting the buck and losing his trail on the river. He wanted to know if I had used an aluminum arrow and I told him yes and that I had my initials on them. He said two of his boys had found a deer yesterday while they were squirrel hunting on the river and that the deer had been shot with an aluminum arrow with the initials J. R. on it. I lit up and he said the deer was hanging in his freezer and it was all mine. I told him the only thing I wanted was the hide and antlers, and he was more than welcome to the meat. He gave me the head, antlers, and the arrow. Now I was relieved to know I had my trophy and the meat could be used also.

I spent the rest of the season trying for another deer and scored the last day of the season with a nice doe. I mounted both heads and hung them on the wall in my trophy room. Each time I look at them I relive the unforgettable day and thirteenth season that I added the limit of deer to my collection of 32 bringing the total to 34. Each day I live I thank the good Lord for letting me enjoy the outdoors and trying to live up to His expectations. ⬍

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